

RAF FIGHTER COMMAND PILOT

The Western Front 1939–42



MARK BARBER

ILLUSTRATED BY GRAHAM TURNER

WARRIOR • 164

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Series editor Marcus Cowper

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RAF FIGHTER COMMAND PILOT THE WESTERN FRONT 1939–42

RAF FIGHTER COMMAND IN THE INTER-WAR PERIOD

When war broke out in 1939, not only was the Royal Air Force (RAF) the 'junior service' among Britain's military forces, but military aviation was still in its infancy, and the era before manned, powered flight was still well within living memory. The RAF had been formed in the closing stages of World War I, when the Royal Naval Air Service and the Army's Royal Flying Corps were amalgamated on 1 April 1918. The 59 fighter squadrons, or 'scout' squadrons as they were then known, were based along the Western Front, with a further 16 tasked with defending the home front. Immediately following the Armistice, the RAF, like the other services, experienced enormous cutbacks as the military stepped down from a war footing and the vast majority of service personnel returned to civilian life. The RAF was reduced from being the world's largest air force at its inception, with some 290,000 personnel and 3,500 aircraft, to losing 90 per cent of its manpower in the post-war demobilization. Peacetime strength was planned at less than 30,000 officers and other ranks and, by 1920, the RAF consisted of only 25 squadrons of all types of aircraft.

The vast war-weariness that swept across the nation in the post-war years permeated parliament, leading to the 'Ten Year Rule' guideline. This was adopted by the British Government in August 1919 and stated that the armed forces should be formed and maintained on the assumption that the British Empire would not be involved in any major wars for the next decade. This had as much a profound effect on the fighter arm of the RAF as on every branch of all three services – by the late 1920s, technological development of fighter aircraft had slowed to such a pace that the vast leaps made during World War I were reduced to a mere trickle. The Sopwith Camels and SE5as that the RAF used at the time of the Armistice had been replaced only by Gloster Gamecocks and Bristol Bulldogs – open-cockpit biplanes with a similar armament and only marginally superior performance to their Great War ancestors. There had been some optimism for the fighter squadrons of the RAF in April 1923, when recommendations by the Steel-Bartholomew Committee on the Air Defence of Great Britain led to the establishment of a strength of 52 squadrons for Home Defence, 17 of which would be fighter squadrons. These would fall under the command of the Air Defence of Great Britain (ADGB) that was established in 1925 under Air Marshall Sir John

Salmond. However, the '52 squadron plan' was deferred. Originally to be implemented with 'as little delay as possible' in 1923, two years later it was judged far less urgent, and put back to 1935–36. Furthermore, the low number of fighter squadrons within the total plan indicated a clear and obvious preference for funding bomber squadrons. This was articulated in November 1932 during Stanley Baldwin's famous speech to the House of Commons: 'In the next war you will find that any town within reach of an aerodrome can be bombed within the first five minutes of war to an extent inconceivable in the last war. ... I think it is well also for the man in the street to realise that there is no power on earth that can protect him from being bombed, whatever people may tell him. The bomber will always get through.'

Hampered by the global depression, the plan was delayed again in December 1929, and then again in May 1933, by which time the first stirrings of another major war were beginning as Adolf Hitler had been democratically elected in Germany only two months previously. By 1934 Germany was emerging as a clear threat, with British Intelligence well aware of Hitler's rearmament programme in defiance of the limitations laid down by the Treaty of Versailles. Britain finally began plans for a more effective rearmament, although for the RAF this would still be dominated by the bomber. In July 1934 the British government adopted the new 'Scheme A', which planned for 84 squadrons, 28 of which would be fighter squadrons, to be effective by March 1939. 'Scheme C' came into effect in May 1935, and called for 123 squadrons, including 35 fighter squadrons, to be in service by the end of March 1937. Critically, Scheme C also radically altered the entire command and control structure of the RAF to enable functional and administrative control over the newly proposed strength. The ADGB was dissolved and four new Commands were created: Training, Coastal, Bomber and Fighter.

Fighter Command became operational on 14 July 1936, under Air Marshall Sir Hugh Dowding at RAF Bentley Priory. Dowding had commanded No. 16 Squadron RFC on the Western Front during World War I, but after altercations with General Hugh Trenchard, overall commander of the RFC, Dowding spent the last two years of the war in Great Britain, albeit with the rank of brigadier. Dowding's new Fighter Command was made up of four groups – No. 11 and No. 12 (Fighter) Groups, No. 22 (Army Co-operation) Group and the Observer Corps. Dowding made two major contributions to the development of Britain's aerial defence. First, he pushed for the development of modern, fast and heavily armed fighters to replace his force of soon-to-be-obsolete biplanes. Dowding engaged

Promoted to Air Chief Marshall in 1937, Hugh Dowding commanded RAF Fighter Command at the outbreak of the war. Here photographed as an officer in the Royal Flying Corps during World War I, Dowding had experience of front-line squadron command. (RAF Museum, PO23092)



Indicative of the technological standard of aircraft employed by the RAF throughout the inter-war period, the Bristol Bulldog was an open-cockpit, fixed undercarriage, two-gun biplane with a fixed pitch propeller. Still equipping squadrons into the 1930s, the Bulldog was similar in many respects to its Great War predecessors. (RAF Museum, PC71-66-83)



in talks with Hawker and Supermarine about the need for a modern, fast, monoplane fighter effectively to combat the worrying reports of world-class fighters and bombers being developed in Germany. He also developed Britain's network of fighter defence, which would become known as the 'Dowding System'. This involved heavy investment in Radio Direction Finding (RDF) – or radar as it would become known – partnered with the Observer Corps and command centres to build a picture of incoming threats before effectively controlling Fighter Command via raid plotting and radio control. Although he had his critics, Dowding's system would soon be proved absolutely integral to the defence of the entire nation.

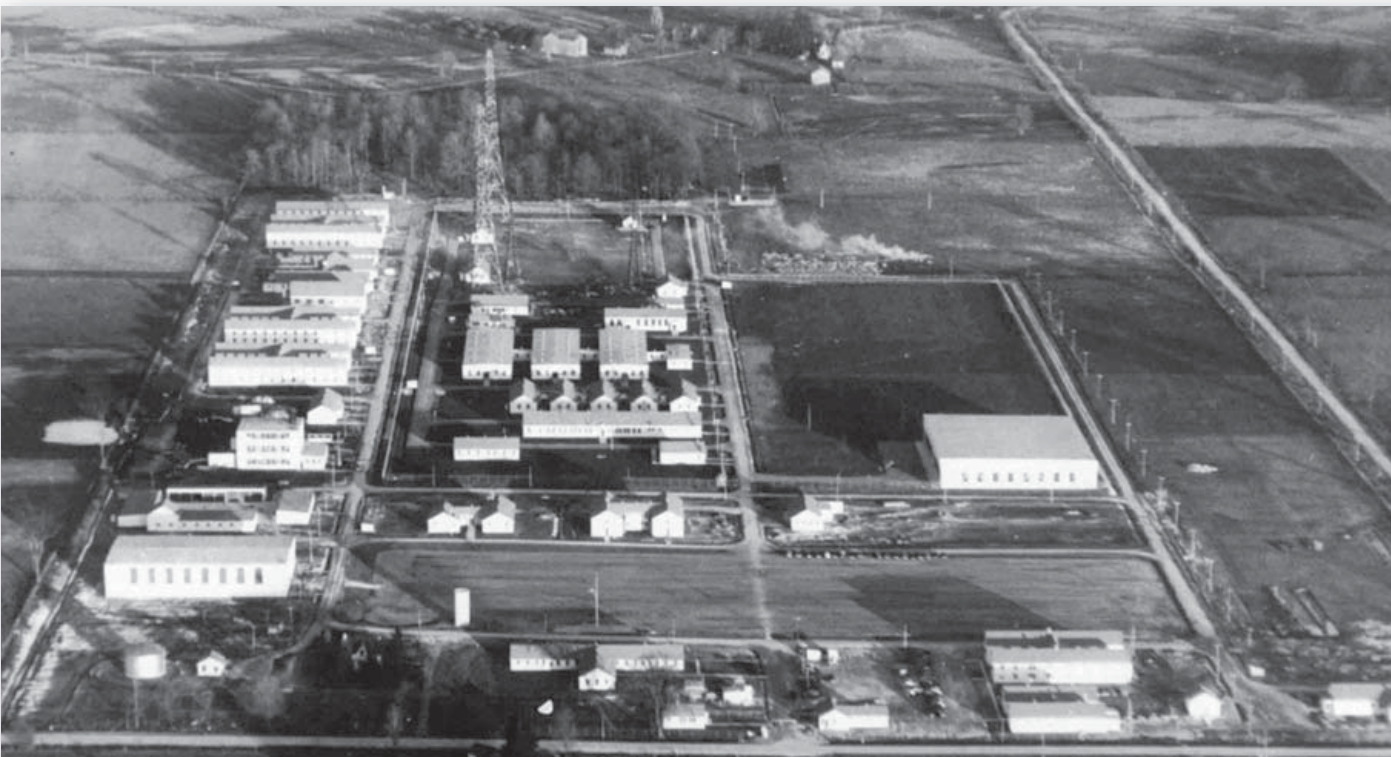
When Dowding took charge of the new Fighter Command he controlled a mere 18 fighter squadrons equipped with open-cockpit, two-gun biplanes. While the development of the fighter had still not come a long way since 1918, Britain was by no means alone in its stagnancy. While also rushing to develop a modern, monoplane fighter, in early 1936 Germany was employing similar types of aircraft to the RAF. All this was about to change for both nations; the eight-gun, monoplane Hawker Hurricane had carried out its initial test flight on 6 November 1935 and on 3 June 1936, the Air Ministry placed orders for 600 Hurricanes for Fighter Command. Only shortly behind chronologically was the Supermarine Spitfire, whose first prototype was flown on 5 March 1936 in response to Air Ministry Specification F.5/34, calling for an eight-gun, enclosed cockpit, retractable landing gear, monoplane fighter – the same call to arms which had spurred Hawker into action. F.5/34 demanded, in effect, a fighter to shoot down bombers. Speed, rate of climb and firepower were essential, whereas manoeuvrability was secondary. 'Scheme F' – approved on 25 February 1936, promised to deliver 123 squadrons to the RAF by the end of March 1939; 30 of these would be fighter squadrons, made up of 500 Hurricanes and 300 Spitfires.

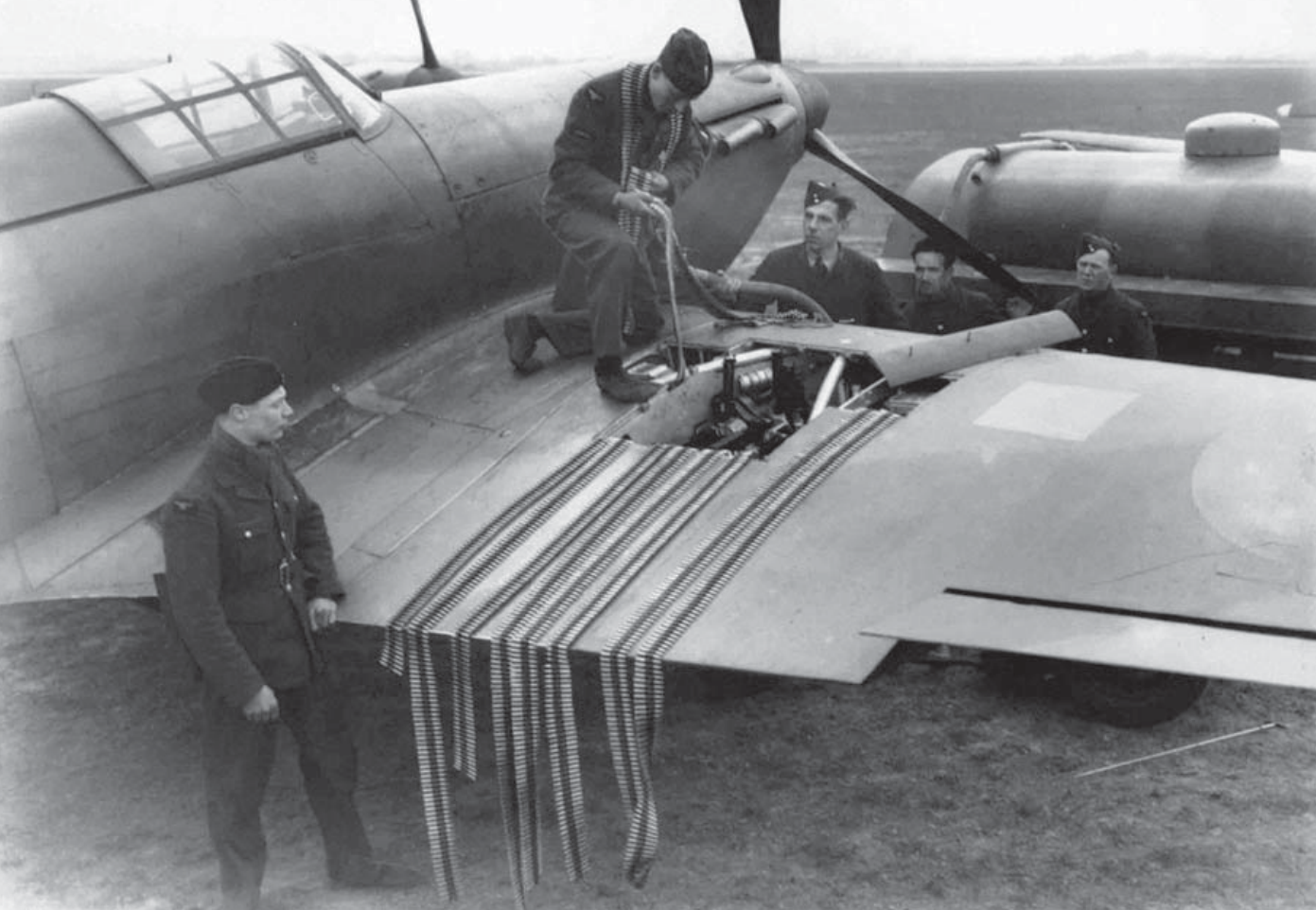
However, while Fighter Command would use the Hurricane and Spitfire very successfully, also in development was the Bolton Paul Defiant. With the manoeuvre-based dogfights of the last war now considered a thing of the past, 'modern' fighters were developed to combat the main threat: bombers. The Defiant was a single-engine monoplane whose armament consisted of four machine guns in a turret behind the pilot's cockpit. In theory, this fighter had the punch to break up enemy bomber formations whose escort would not have the range to accompany them far over Britain. In practise, the weight of the turret and gunner made the Defiant nothing short of a disaster as a day

fighter. The Bristol Blenheim was another fighter aircraft which proved a sad reflection of the experience lost since World War I. A twin-engine aircraft that had started life as a private venture intended for Bomber Command, it was fitted with a tray housing four machine guns beneath the fuselage. The Blenheim 1F entered service with Fighter Command as a long-range fighter in December 1938, in an era when manoeuvrability was thought to be secondary to speed and firepower.

In the build-up to war in the late 1930s, the RAF could at least draw some consolation from the almost last-minute push to modernize its aircraft: the Spitfire and, to a slightly lesser extent the Hurricane, were undoubtedly a match for Germany's formidable Messerschmitt Bf 109 fighter. However, while the RAF would have the modern aircraft and first-class aircrew training to go to war, doctrine and experience were sadly lacking. With the outbreak of the Spanish Civil War in July 1936 Germany set up the Condor Legion, a unit that provided military aid to the Spanish Nationalist rebels. The involvement of the Condor Legion in the Spanish Civil War could almost be considered a dress rehearsal for the blitzkrieg that would sweep across Europe in 1939. In Spain the pilots of the Condor Legion learned the value of carpet-bombing, terror-bombing, air support for lightning-fast advances by ground forces, and the role of the fighter aircraft in all of this. Unfortunately for the RAF, while the Luftwaffe was learning by trial and error in Spain, British fighter pilots could only rely on old, outdated and untested tactics in air-to-air combat. Furthermore, although British pilot training was among the best in the world, it was still no substitute for the actual combat experience that many German pilots were gaining. Pilots who had actual combat experience in World War I still served at various levels of Fighter Command, but the vast majority of squadron commanding officers were men who had only ever flown in peacetime.

One of the most vital aids to the pilots of RAF Fighter Command in the defence of Britain was RDF, or Radio Direction Finding. Set up in a defensive perimeter codenamed 'Chain Home', RDF was effectively an early network of radar stations whose detection of incoming enemy aircraft would be plotted at the main operations room of Fighter Command HQ at Bentley Priory. (RAF Museum, PC95-111-2)





Eager to see his pilots equipped with high-performance, eight-gun monoplane fighters, Dowding welcomed the introduction of the Hawker Hurricane, the first modern aircraft to enter service. (RAF Museum, PC98-173-5884-11)

With war considered by most to be a grim and unavoidable eventuality, reservists were mobilized into the RAF in August 1939. The RAF Volunteer Reserve had been created in 1936 to provide training for some 800 pilots per year. Although these pilots did not have the benefit of continuous experience in front-line fighter aircraft afforded to their regular RAF peers, they added an absolutely pivotal strength to Fighter Command in the days leading up to the outbreak of hostilities, and were a better trained cadre than many of those who would be rushed through training during some periods of the war.

When Britain declared war on Germany on 3 September 1939, Fighter Command was able to muster a strength of 39 squadrons; the most recent assessment by the Chief of Air Staff estimated that the absolute minimum number of fighter squadrons necessary for a coherent defence of Britain was 53. There were 30 squadrons of single-engine fighters available, consisting of some 570 Hurricanes, Spitfires, Defiants and Gladiators, with 659 pilots. Another seven squadrons of Blenheims bolstered the numbers, with 107 crews available. Finally, two squadrons of ageing Gauntlet and Hind biplanes were still on the books. With single-engine fighters set to form the bulk of the nation's defence, perhaps the most worrying statistic at the outbreak of the war was the comparatively low number of pilots in relation to the number of available airframes. Fighter Command entered World War II with poor tactics and doctrine, no current combat experience and a poor strength of truly modern aircraft but, thanks to Dowding and other far-sighted individuals, Fighter Command was significantly stronger than it would have been under the guidance of less capable men.

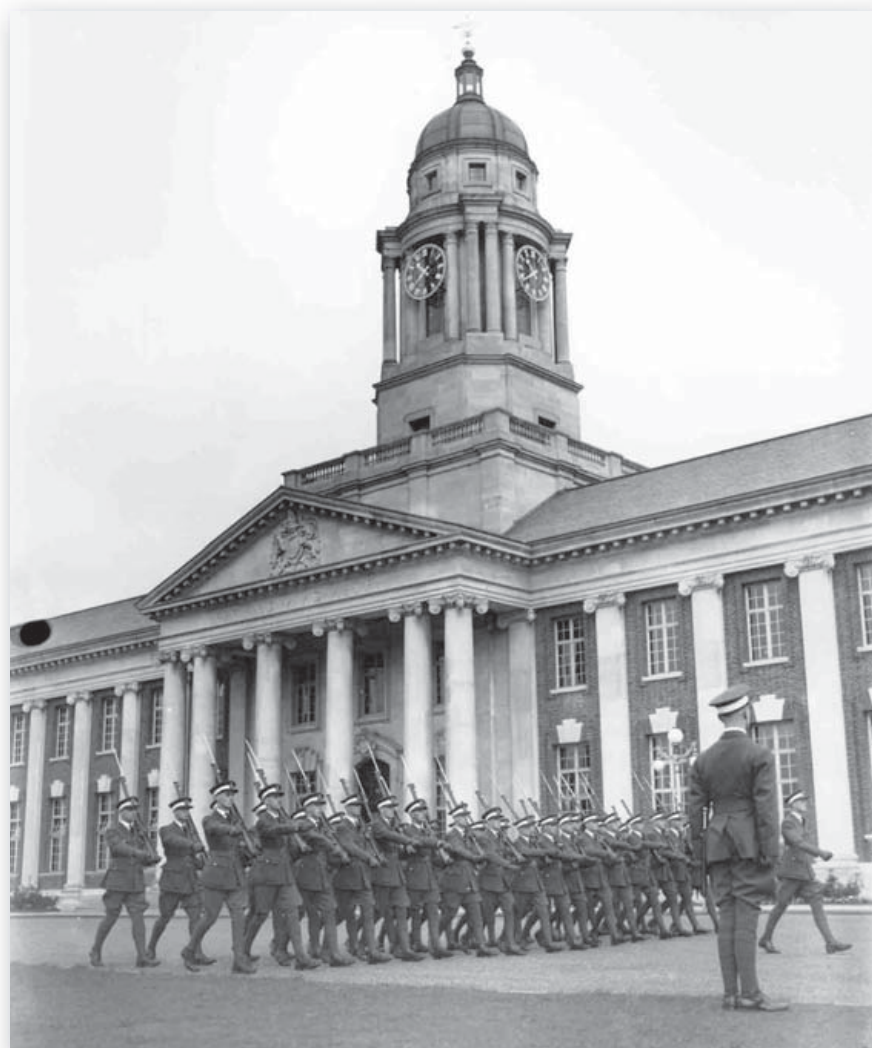
RECRUITMENT AND TRAINING

In comparison to the Royal Navy and Army, the RAF had less of a problem with attracting volunteers to join its ranks. Furthermore, within the aircrew fraternity the role of fighter pilot was considered to be something of an elite status, and a glamorous calling for many young men considering a career in the military. During World War I the act of shooting down other aircraft had been glorified by the media, with pilots who achieved 'ace' status being mentioned in newspapers and the most successful even becoming household names. The notion of controlling an agile, exciting aircraft in a dogfight with the prospect of media attention bringing fame back home appealed far more than the prospect of piloting a heavy aircraft laden with bombs on long-range raids over enemy territory, most of which would be in straight and level flight. This absolute fallacy was compounded by popular fiction such as Captain W. E. John's adventures *Biggles*, which were aimed at an adolescent market and glorified air combat. Whereas *Biggles*, which was hugely successful in the inter-war period, proved inspirational to many aspiring fighter pilots, despite its minimal factual basis, more realistic accounts of air combat in World War I, such as *Winged Victory* by V. M. Yeates, met far less commercial success. This glamorous appeal ensured that there was never a problem attracting volunteers to the RAF in the inter-war period, with the number of applicants always exceeding the training capacity for pilots. As a result, many aspiring pilots would fail selection, being offered non-piloting jobs within the aircrew cadre or ground-based branches, or denied entry into the service altogether.

The outbreak of war brought a different aspect to the recruitment process. The National Service Act made all fit adult males liable for war work of some description. Warned of the horrors of trench warfare by an older generation, huge numbers of young men still applied to become pilots in the RAF as the 'lesser of two evils', considering that military service was an inevitability for most. After the outbreak of war, the number of non-British nationals flying aircraft in Fighter Command increased hugely. Moved by events in Europe such as the Spanish Civil War and the Winter War in Finland, small numbers of Americans volunteered for service as pilots overseas, initially with the Royal Canadian Air Force or with the plan to join a US detachment of the French Air Force. With the fall of France, the RAF was now the next logical option for American pilots wanting to help in the fight against Nazi Germany. Seven American pilots flew in Fighter Command during the Battle of Britain, and by September 1940, the first of three 'Eagle Squadrons' was formed – fighter squadrons with British commanding officers and flight leaders but American pilots. Many other nationalities flew with the RAF throughout the war – the RAF welcomed into its ranks exiles from fallen European countries such as Poland, Czechoslovakia and France, which gave the RAF hundreds of pilots with actual combat experience and an almost fanatical devotion to duty at a time when they were needed the most. The contribution from Commonwealth nations was also invaluable; hundreds of pilots from New Zealand, Canada and Australia flew with the RAF despite their own nations having air forces. In December 1939, the signing of 'Article XV' meant that personnel of the RAF, RCAF, RAAF and RNZAF who had graduated from the British Commonwealth Air Training Plan were all placed in a pool and made available as operational needs dictated. As a result, the majority of these servicemen would serve with the RAF in front-line roles.

In the pre-war period the first stage of training upon selection for aircrew duties in the RAF would be at RAF College Cranwell in Lincolnshire, where Initial Officer Training was carried out. Officer training had been undertaken at Cranwell since the establishment was transferred to the RAF from the Royal Navy in 1918, with College Hall opening in 1920, but with war approaching it was correctly predicted that the number of officers who would now need training was far in excess of the capacity of Cranwell. Furthermore, the rigorous and comprehensive pre-war programme now needed to be replaced with training that provided little more than the absolute minimum so as to ensure as little a delay as possible in getting officers to the front line. To that end, Cranwell was not used specifically for officer training throughout the war. Moreover, because of these changes and the fact that pilots would now be 'hostilities only' and therefore recruited into the RAFVR, by 1941 a rigid system was in place whereby a trainee pilot would not know if he was going to be an officer until some way into his flying training.

After volunteering for service as aircrew with the RAF at a local recruiting centre, applicants would then return to their civilian occupation while waiting



Originally a training establishment for the Royal Naval Air Service, Cranwell was transferred to the newly formed RAF in 1918. Officer cadets would conduct their initial officer training and obtain their commission at Cranwell, with some also undergoing early stages of their flying training at the same location. (RAF Museum, PC98-173-5605-1)

for a joining letter. After receiving their joining dates, new recruits would then report to an ACRC – Air Crew Reception Centre – where they would spend between two and ten weeks, the exact duration varying throughout the war. As an aircraftman 2nd class, aspiring aircrew would learn the basics of service life, including stringent medical examinations (particularly with regards to eyesight), written exams, centred heavily around mathematics, drill, guard duties, and kit issue and husbandry. Following successful completion at the ACRC, potential aircrew would move on to one of many Initial Training Wings (ITW) situated throughout the country. ITW built on the lessons learned at ACRC, with further tutorials on mathematics, meteorology and principles of flight, drill and PT, and the issue of flying kit.

However, an extra step in the process was introduced in late 1941 – grading. Grading involved a short flying course at an Elementary Flying School, where students were given a limited number of hours of dual instruction on De Havilland Tiger Moths or Miles Magisters. Within around 12 hours of instruction, students needed to show the necessary levels of competency with which to ‘go solo’ – to carry out their first flight without an instructor. Effectively a cull to save valuable time and resources at later stages of training, those without the required aptitude would be failed from the pilot training pipeline at this point. Only at this stage were successful trainees ready to commence flying training in earnest, and as a result were promoted to leading aircraftmen. However, places on flying training courses were finite, and the newly classified ‘Pilot Under Training’ would be sent to an Aircrew Dispatch Centre to await his next flying training course.

In the first two years of the war, flying training was almost exclusively carried out within Britain. Elementary Flying Training (EFT) was again carried out on either Tiger Moths or Magisters – the first purpose-designed monoplane training aircraft operated by the RAF. Trainee pilots would progress through a rigid and comprehensive syllabus, commencing with the primary and secondary effects of controls, and then progressing on to the relatively simple but vital skills of straight and level flight, medium turns,



First flying in 1937, the Miles Magister was the RAF's first monoplane designed specifically as a trainer, and with its low wing provided a good introduction to front-line fighters. (RAF Museum, PC98-173-5732-4)



Trainee Pilots and instructors pose by a De Havilland Tiger Moth trainer. The leads for their Gosport tubes can be seen hanging from their helmet ear pieces – the Tiger Moth had no internal radio, leaving the crew to communicate via simple speaking tubes. (RAF Museum, P016609)

climbing and descending and stall recoveries. Once these skills had been completed to a satisfactory standard, pilots would begin flying circuits. The circuit consisted of taking off, climbing and levelling off before turning to fly straight and level downwind, parallel to the runway, then turning to line the aircraft up for landing on ‘finals’ and then either carrying out a full stop landing or a ‘roll’ – touching the wheels down and then powering up to carry out further circuits. The circuit was not only an excellent tool with which to learn and maintain essential handling skills, but also a technique used on front-line air stations to ensure safe distances were maintained between aircraft joining, departing or operating on the runway. The student pilot’s first solo on type would then consist of a single circuit – in the days prior to the addition of grading in the pilot training syllabus, this would be the pilot’s very first solo. The first solo was a huge step in the pilot’s career, as described in a letter home by Arthur Vincent Gowers from the De Havilland School of Flying near Maidenhead in 1937 (Gowers would go on to fly Hurricanes and achieve the rank of squadron leader). ‘You will be pleased to hear that I went “solo” today, after passing the test yesterday. It’s a grand feeling, being up there all on your own, swearing into the telephones (aircraft’s internal communication system) at an imaginary instructor! I had an irresistible desire to “shoot up” the neighbouring village, but was checked by the thought that low flying is the quickest way out of the Service.’

Solo consolidation would be carried out in the circuit, and from this stage of training pilots were given dual instruction before then repeating lessons while flying solo. The exact syllabus content changed several times throughout the war, but further instruction included spinning, navigation and formation

flying before successful pilots passed the course with some 50 hours flying, up to half of which could be solo. Unfortunately, many pilots would fail EFT and considerable numbers would also be KIFA – Killed in Flying Accidents.

For British-based flying training in the opening stages of the war, the next stage echoed the pre-war training system, moving on to Service Flying Training (SFT). This was carried out in a dual-control training aircraft, but a higher performance model, such as the Miles Master, was used to bridge the gap between Elementary Flying Training and front-line types. SFT also varied in duration and syllabus content throughout the war, but typically consisted of some 80 hours flying. Many stages of SFT, particularly the first half of the course, were re-flights of EFT, but were carried out in a faster and more demanding aircraft. Again, pilots were expected to advance to solo standard before a short period of consolidation, then further dual instructional sorties, followed by repeating these exercises solo. Night flying was a new addition to the trainee pilot's skill set during SFT.

By mid-1941 a growing number of pilots were being trained overseas, notably in the United States or as part of the British Commonwealth Air Training Plan. For those bound for the USA, flying training followed a slightly different programme of events. Trainee pilots – who were strictly ordered to wear civilian clothes while off base in the days before the United States entered the war – were posted to either a United States Army Air Corps or a civilian flying training base to carry out EFT, followed by Basic (BFT) and then Advanced Flying Training (AFT). Each stage of training built on the previous stage, progressing through faster and more complex aircraft types. A typical training pipeline with the USAAC might consist of EFT on the Stearman biplane, BFT on the Valiant and then AFT on the relatively high-performance Texan.

Like their contemporaries completing SFT in Britain, pilots training in the USA were awarded their 'wings' – the pilot's flying badge on completion of AFT. For leading aircraftsmen of the RAFVR, the decision was now made regarding their commission. The RAFVR looked for leadership potential in its officers, and with thousands of pilots under training moving through its pipelines, quick decisions needed to be made on whether or not an individual would qualify for a commission. As a rule of thumb those with a university education or public school background were very often selected as officers, whereas the majority of others would become NCO pilots. Streaming was also an important part of the flying training system. A large number of trainee pilots, although certainly not all, wanted to fly fighters. However, individual strengths and weaknesses and the needs of the service were more of a driving force behind the selection of fighter pilots rather than individual preference. Fighter pilots, particularly those moving on to single seat aircraft, needed the mental capacity and situational awareness required to pilot a high-performance aircraft alone, while simultaneously dealing with airmanship

Entering service in 1932, the De Havilland Tiger Moth was used for Elementary Flying Training, and grading later on in the war. It was also used by civilian flying schools to train RAF pilots during the war. (RAF Museum, P016742)



considerations such as navigation, fuel management and communications. Coordination and 'hands on' piloting skills were also a must, but many successful fighter pilots were stronger at air gunnery than actual flying. With some now striped up as officers, all proudly wearing the pilot's flying badge, those streamed as fighter pilots would now move on to one of the Operational Training Units (OTU) in Britain to complete the last stages of their training.

The OTU was the final bridge over the gap between a pilot of a training aircraft and a front-line combat aircraft. For pilots of the pre-war era and opening stages of the war, the front-line role training was carried out at the individual's front-line squadron. This meant that fighter pilots would be posted to their new squadron with very little time in single-seat fighters, and in some cases with no tactical training of any sort. This system worked well enough during the inter-war years; there was plenty of experience on each squadron and no rush to bring new pilots up to speed. However, with the outbreak of war and the massive increase in the number of pilots moving up through the training system, this was simply no longer feasible and was one of the reasons behind the creation of OTUs.

In January 1939, No. 11 Fighter Group Pool was formed at Andover, a holding area for freshly trained fighter pilots to work up on Hawker Hurricanes and Fairey Battles if they were not allocated a place on a front-line squadron as soon as they had finished training. This provided valuable experience on front-line aircraft, but still no tactical training was provided so it was still not a true OTU. In the early stages of the war, new fighter pilots often arrived at front-line squadrons with no training in formation attacks or having ever fired guns from an aircraft – a lack of gunnery training was perhaps the single largest shortcoming in Fighter Command's training.

Number 12 Group's Pool was created at Ashton Down in September 1939, operating Gloster Gladiators, North American Harvards and Bristol Blenheims. It was not until March 1940 that these two units were redesignated as No. 6

An assortment of training aircraft at No. 20 Service Flying School. The types in the foreground are North American Harvards, high-performance aircraft used in advanced training. (RAF Museum, P016630)





The cockpit of a Hawker Hurricane: the instruments are deliberately set out for the 'selective scan' used in instrument flying, a technique which had developed into an embryonic state in World War I for flying through cloud. The technique involves centring the scan around the artificial horizon, then glancing across at other instruments at regular intervals. (RAF Museum, P010041)

and No. 5 OTUs respectively, now equipped with a mixture of front-line and training aircraft, including 48 Hurricanes and 34 Spitfires. By June 1940, in keeping with plans for Bomber Command's new training scheme, the decision was taken to make the OTU mandatory for all new pilots. This at least ensured that by the time of the Battle of Britain, new pilots would arrive at front-line squadrons with some experience of their operational type. The number of OTUs steadily increased throughout the war. As well as providing new pilots with valuable extra dual-seat tuition in a high performance trainer and single seat experience in their front-line type, formalized air-to-air gunnery training was finally provided, although poor training in this skill continued to plague fresh Fighter Command pilots throughout the early years of the war.

EQUIPMENT: FLYING CLOTHING AND UNIFORM

Daily working dress for RAF officers had remained largely unchanged since the incorporation of the Air Force blue (or blue-grey as it was known) Service Dress uniform in 1919, as a result of Air Ministry Order 1049. Other ranks were only allowed to wear the RAF's new colours from October 1919 after AMO 1150 sanctioned them wearing blue-grey for ceremonial and walking-out purposes only. Blue-grey was not permitted as working dress until 1924. By 1936, much of the RAF working uniform was standardized between officers and other ranks, including the jacket. Single breasted with four buttons and a fabric belt, the jacket had flap pockets at the breast and hip, with officers and warrant officers having buttons on all pockets whilst other ranks only had buttons on the breast pockets.

Rank was worn on the upper sleeve for NCOs and on the cuff for officers and warrant officers, with pilots wearing their wings above the left breast pocket. Pilots who had joined the RAF Volunteer Reserve or Auxiliary Air Force before the war wore a 'VR' or 'A' badge respectively on their jackets; officers wore the badge in gilt metal on their collars, NCOs wore an embroidered version below the eagle badge on their shoulders. For pilots of



One of the top aces of Fighter Command in the first years of the war, Robert Stanford Tuck, poses in front of his Spitfire while serving on No. 92 Squadron. He wears standard Service Dress uniform with a peaked cap. (RAF Museum, P007985)

Allied nations, a further shoulder badge was worn with their parent nation embroidered on a curved badge at the very top of the sleeve.

A unique trademark of the fighter pilot was the wearing the top button undone on their service jackets, although this practise was often used by aircrew of other commands and services. The jacket was worn over a shirt with separate collar; pale blue for officers and dull blue-grey for other ranks. Black ties and blue-grey trousers were worn by all ranks although, as with the jackets, officers and warrant officers wore uniforms made of soft baratheia, while other ranks wore uniforms of rougher serge.

Further differences between ranks were highlighted with footwear; officers wore shoes of black patent leather, and other ranks wore boots, again of black leather. The peaked cap was constructed of blue-grey fabric, with a black mohair band. The peak itself was fabric-covered for officers and leather for other ranks. The officers' cap badge was based on the gilt eagle, which had been taken directly from the Royal Naval Air Service in 1918. This was surrounded by laurel leaves and topped with a crown; NCO pilots' cap badges replaced the eagle with an 'RAF' monogram. Warrant officers used a simple, gilt metal version of the officers' cap badge. The cap would become an iconic part of the fighter pilot's uniform by one simple virtue – abuse. Contemporary fashion dictated that peaked caps should be worn at slants, with the peak itself bent out of shape so as to curve down at the edges. A mark of experience, the battered cap was a clear sign of a pilot with a respectable amount of hours logged up as opposed to those with pristine caps, straight out of training. Some took this practise further, going as far as to artificially 'age' their caps, removing the wire which prevented them from loosing shape so as to look a little more dishevelled and a little less inexperienced.

An alternative to the peaked cap was the field service cap, or side cap, introduced in 1936. Made of blue-grey material, officers and warrant officers wore a gilt eagle and crown on the left-hand side, whilst NCOs below the rank of warrant officer wore their normal cap badge. Again, this cap was more often than not worn at a suitably fashionable angle by the discerning fighter pilot. From December 1939, the peaked cap was removed from use for NCOs of many branches, aircrew included, and NCO pilots wore only the

A

FLIGHT LIEUTENANT, 1939

Operating from Britain during the Phoney War, this pilot (1) wears a 1930 Pattern Flying Suit with detachable fur collar fitted, under which is worn daily working uniform shirt and tie. He also wears a 1932 Pattern life jacket, with his parachute already fitted before walking out to his aircraft. The parachute itself also formed the pilot's seat cushion, sitting inside the aircraft's bucket seat (2). It was attached via four straps, on the end of which were lugs that fitted into a quick release buckle (3). This system met with some criticism, as on some aircraft types the straps and buckle were very similar to the actual seat harness, meaning that if trying to leave the aircraft in a rush and whilst panicked it was possible to misidentify the buckles and remove the parachute instead of the seat harnesses. The pilot wears a Type B helmet with Type D oxygen mask fitted (4), and earlier 1933 vintage Mk III goggles (5) and 1933 pattern gauntlets. This is completed with 1936 Pattern black leather boots. Whilst wholly functional, this pilot's kit is typical of early war aviators – perfectly useable, but with room for improvement based on operational experience. One of the first changes made based on operational experience was replacing the shirt and tie with a roll-neck or open collar and silk cravat, which were far more forgiving when constantly craning the head during lookout for enemy aircraft.



Pilot Officer Whitney-Straight of No. 601 Squadron poses with greatcoat and peaked cap in front of a Blenheim 1F. The Blenheim's gun tray is visible on the aircraft's belly. (RAF Museum, P001679)



field service cap. The final item of daily working dress was the greatcoat; double-breasted and in blue-grey, made of serge and with four rows of buttons for NCOs, and with five rows of buttons for officers and warrant officers, made of fleece cloth for the former and plain cloth for the latter.

Pilots of No. 501 Squadron in France, 1940. Two pilots wear cotton flying suits, one of which carries the squadron badge on the left breast pocket. A combination of 1936 and 1939 Pattern flying boots are also visible. (RAF Museum, P002750)

In terms of flying clothing, pilots of Fighter Command used a myriad of different garments and attire throughout the war, depending on the theatre, season or the role they were being employed in. Popular in the early stages of the war, the 1930 and 1940 Pattern Flying Suits were one-piece overalls, made of cotton and thicker gabardine respectively. Both patterns of suit could be fitted with a detachable fleece collar and an inner liner, made of fur fabric or quilted kapok. These flying suits were produced in several colours and some squadrons had their squadron badge added to the breast pocket of the suit. Also available was the two-piece Irvin suit, consisting of a jacket and trousers





Prince George, Duke of Kent, visits Polish pilots on the front line. The pilot to his right wears a jumper and cravat, both considered more comfortable than Service Dress uniform within the confines of a fighter cockpit. (RAF Museum, PC77-1-3)

made of brown sheepskin. While the suit was popular in Bomber Command due to the warmth it provided at altitude, pilots of Fighter Command often favoured the jacket alone, worn over the top of daily working dress. The Irvin suit was introduced in 1938, but a second pattern to the jacket was issued during the war with extra seams on the sleeves to reduce production costs by allowing smaller cuts of material to be used. The Irvin jacket would go on to become one of the most enduring images of the RAF pilot.

Pilots in the opening stages of the war had the choice of wearing their blue-grey uniform in the cockpit, with or without an Irvin jacket, or a one-piece flying suit. Early experience of combat added another essential item to this – the silk scarf or cravat. As the primary job of any fighter pilot was to close with and shoot down enemy aircraft, the fighter pilot would spend his entire sortie scanning the skies for enemy aircraft, constantly craning his neck and keeping his head moving. To prevent rubbing his neck raw against the starched collar of his uniform shirt, the collar would often be worn open with a privately purchased cravat replacing the uniform tie. Whilst other branches or services often dismissed this as an extravagance, the silk cravat was more than just self-indulgence on the fighter pilot's part. A popular alternative to this was the roll-neck jumper, produced in unbleached white wool and worn with the one-piece flying suit or blue-grey jacket.

Initial experience also revealed that the smart Service Dress uniform was far from ideal for continued use within the cramped confines of an aircraft, not being designed for comfort or durability in these conditions. To that end, a blue-grey version of the army's battledress – the Suit, Aircrew – was announced in December 1940. This consisted of a short jacket with integral belt and epaulettes, and trousers with buttoned ankle tabs. Officers wore their rank on the epaulettes, and NCO rank was displayed on the right sleeve, with wings being sewn above the left breast pocket. The aircrew suit proved popular and was often worn by aircrew in lieu of Service Dress for non-flying duties.

Once basic clothing had been covered, the pilot needed his specialist safety equipment; a flying helmet with goggles and mask, a life jacket, and finally

Czechoslovakian Hurricane pilots are visited by an air vice marshal at Duxford in summer 1940. Of note, the Czech pilots wear their original pilots' wings on the right breast pocket of their RAF Service Dress jackets. (RAF Museum, X003-6084-047)



boots and gloves. At the start of the war, RAF aircrew used the Type B flying helmet, made of brown leather with chamois lining and integral earpieces inside zipped external housings. The earpieces were attached to the aircraft's radios via a 'pig tail' – a male/female intercom that was designed to part easily so that it would not constitute a snagging hazard if the pilot needed to vacate the cockpit in an emergency. As a back-up to this, the adjustment slit at the rear of the helmet could also be used as a quick release. The Type B helmet was

B

SERGEANT, 1941

Building on the experience of the last two years of operations, this pilot's equipment is more practical. He wears an Irvin jacket over a Suit, Aircrew jacket (1). A roll neck replaces his collar and tie and he also wears a 1941 Pattern life jacket (2) and 1941 Pattern boots, together with the light chamois inner glove. Also worn are a Type C helmet and Type E oxygen mask (3). His goggles are fitted with a flip-up anti-glare shield for aiding visibility in bright sunlight (4). In only two years, the flying clothing preferred by many pilots of Fighter Command has changed markedly.

Badges of rank are illustrated up to the rank of group captain; the highest rank a pilot could hope to achieve without leaving the cockpit for a staff post. Station commanders were typically group captains and were discouraged from flying on combat operations, although individuals such as Adolph Malan often paid lip service to this guidance. The rank of wing commander was typically responsible for a wing of three squadrons, a squadron leader naturally commanded a single squadron and a flight lieutenant would be his second in command, responsible for leading the second flight of the squadron. The officer ranks of the RAF were simple modifications of naval ranks after the RNAS and RFC were merged to form the RAF; flight lieutenant and wing commander were RNAS ranks with the similar responsibilities to their new RAF counterparts, and squadron leader was a modification of squadron commander, itself based on the rank of lieutenant commander. The rank of group captain, equivalent to an army colonel, was used as RFC colonels typically commanded groups.

Rank from top left: sergeant, flight sergeant, warrant officer class 2, warrant officer class 1, pilot officer, flying officer, flight lieutenant, squadron leader, wing commander, group captain. The pilot's flying badge is also illustrated above. The rank of warrant officer 2 was declared obsolete during the inter-war period; however, not all WO2s were automatically promoted to WO1, so the badge is included here for completeness.



4

3



1



2



GRAHAM TURNER '12

Pilot Officer Williams of No. 92 Squadron stands in front of his Spitfire Mk 1. He wears a Type B flying helmet with Type D oxygen mask. He also wears the top button of his Service Dress jacket undone in typical fighter pilot styling. (RAF Museum, P007981)



designed to work in conjunction with the Type D oxygen mask, which was fitted to the front via press studs. The Type D mask was of constant flow design, made of green fabric with a chamois lining. The oxygen mask also had an integral microphone for radio communications or, in the case of multi-crew aircraft, speaking via the intercom. Five separate specifications of microphone were cycled through the service life period of the Type D mask. The Type B helmet was logically replaced with the Type C in mid-1941, which was of a similar appearance but was designed to be more comfortable, with the earpieces now sited inside cylindrical housings of black rubber. The Type C helmet was compatible with the older Type D mask, but this too was replaced by the Type E oxygen mask in 1941. This black rubber mask was the first to feature a regulated flow design, which released air only upon inhalation by the user rather than the constant flow of older, less sophisticated designs.

Pilots entered the war with the 1933 Mk III goggles. Of a simple design, these consisted of celluloid windows in a padded leather frame, mounted on an elasticated headband. These were replaced in mid-1940 with the Mk IV, which came in three variants, depending on whether the window housings



were constructed of brass or Bakelite. The Mk IV also had clip-on rubber pads and an adjustable nosepiece to fit the wearer more closely, and had provision to add a tinted anti-glare panel above the windows. The Mk IV goggles did not always sit easily in place with the large earpieces of the Type B helmet; this was overcome either by fitting large loops to the goggle band to fit around the earpieces, or by securing them in place via press-studs. The addition of these loops and studs increased the weight of the Mk IV goggles and made them unpopular with some pilots.

The RAF's life jacket at the beginning of the war was the 1932 Pattern, a cotton, three-button waistcoat with an oral inflation valve protruding from the left stole. Manufactured in a dull khaki, squadrons of Fighter Command often had them painted yellow for higher visibility in the event of aircraft ditching. The life jacket, when inflated, was colloquially known as the 'Mae West' due to its passing resemblance to the most defining features of this contemporary actress. The improved Life Jacket Mk 1, which had a carbon dioxide cylinder for inflation, with the oral inflation tube now being used only for top up was released in July 1941. Further improvements consisted of a fluorescent dye for releasing into the sea and a floating flap behind the head, both of which were added to aid spotting by rescue aircraft.

Whilst specialized footwear had existed for aircrew since the earliest days of aviation, some pilots found that during the hotter summer months normal working shoes were sufficient for flying. However, for the colder seasons and higher altitude flying, three types of flying boot were in use by Fighter Command at the outbreak of the war. The 1930 Pattern boot was made up of suede with a sheepskin lining and a front zip. The 1936 Pattern was of black leather, manufactured with a fleece lining and a tightening strap at the upper shin. The 1939 Pattern was of similar cut, but was made of vulcanized

Pilots and ground crews of No. 43 Squadron with a Hurricane Mk 1. The pilots wear an assortment of flying suits, some with the detachable fur collar fitted, with 1932 Pattern life jackets. (RAF Museum, X005-2530-005)

fabric; it failed to repel moisture, which consequently froze once aircraft climbed above the zero degree isotherm. Each pattern was intended to replace its predecessor, but all three existed concurrently by the outbreak of the war. The latter two patterns proved difficult to fit with bulkier flying suits, prompting the release of the 1940 Pattern boot, which bizarrely did not enter service until July 1941. This had a similar front zip to the 1930 Pattern and was constructed of brown split hide and sheepskin lining. It was redesignated the 1941 Pattern following the addition of an ankle strap to tighten the boots after operational experience revealed they had a propensity to remove themselves from the feet following baling out.

Flying gloves consisted of silk and chamois inner gloves, fingerless woollen mitts, and finally an outer gauntlet of brown leather with a cuff zip, designated the 1933 Pattern. In practise, with fighter pilots generally flying much shorter sorties than their brethren in Bomber and Coastal Command, the white chamois leather inner gloves were sufficient. However, early experience of the consequences of cockpit fires meant that even light gloves acted as a simple protective layer against fire, and gloves were not abandoned until aircrew moved to hotter climes later in the war.

AIRCRAFT OF FIGHTER COMMAND

Gloster Gladiator

The Gloster Gladiator represented perhaps the ultimate evolution in the design of the biplane fighter, but was outclassed by modern, high-performance monoplanes even before war broke out. (RAF Museum, P006781)

Although it entered service only a few months before the much more modern Hawker Hurricane, the Gladiator was in many ways a development of the Gloster Gauntlet biplane fighter and was considered by some to be the pinnacle of the biplane fighter concept. Gloster submitted the design to the Air Ministry in 1935, and the first production variants were delivered in February and March of 1937. Powered by an 830hp Bristol Mercury radial engine, the Gladiator Mk II, which was in service by the beginning of the



war, was capable of speeds in excess of 400km/h (250mph), with a range of some 700km (440 miles). It was armed with four .303in. Browning machine guns, two carried underneath the lower wings and two mounted to each side of the engine. With its enclosed cockpit and automatic mixture control, the Gladiator did possess some modern features. Many pilots noted its exceptional handling characteristics and near perfect harmony of controls. However, as a fixed undercarriage biplane it was arguably obsolete when it entered service, particularly when one considers the opposition it would soon encounter. Nevertheless, when facing foes such as the Italian Air Force in North Africa and Malta, the Gladiator performed commendably, with Flt. Lt. 'Pat' Pattle claiming 15½ kills in Gladiators, with a further four probables. While popular with its pilots, the Gladiator was unable to contend with modern opposition such as the Bf 109, and was ultimately replaced by the Hurricane and Spitfire, although it continued to fly in communications, liaison and meteorological roles until 1944.

Bristol Blenheim

The Blenheim entered service in March 1937 as a light day bomber, stunning the world's aviation journalists with its modern appearance and features, such as its all-metal construction (apart from its fabric-covered control surfaces), split trailing edge flaps, Frise mass balanced ailerons and a top speed of 450km/h (285mph); it was faster than many fighters of the era. Modified for service as a long-range fighter, the 1F variant was equipped with a tray of four .303in. machine guns in the belly to augment its single .303in. gun turret. However, although the Blenheim's range of over 1,600km (1,000 miles) made it theoretically useful in its role as a long-range fighter, its cumbersome handling characteristics in comparison to modern, single-engine fighters made it poor in a dogfight, and early clashes left the Blenheim squadrons suffering heavy casualties. More useful were approximately 200 examples that were fitted with pioneering Airborne Interception (AI) radars for use as

With its prototype being capable of reaching speeds far greater than any fighter operated by the RAF when it first flew in 1935, great things were expected of the Blenheim in the opening stages of the war. However, it proved vulnerable to enemy fighters in daylight operations and the 1F fighter variant was restricted to night-fighter duties. (RAF Museum, P001667)

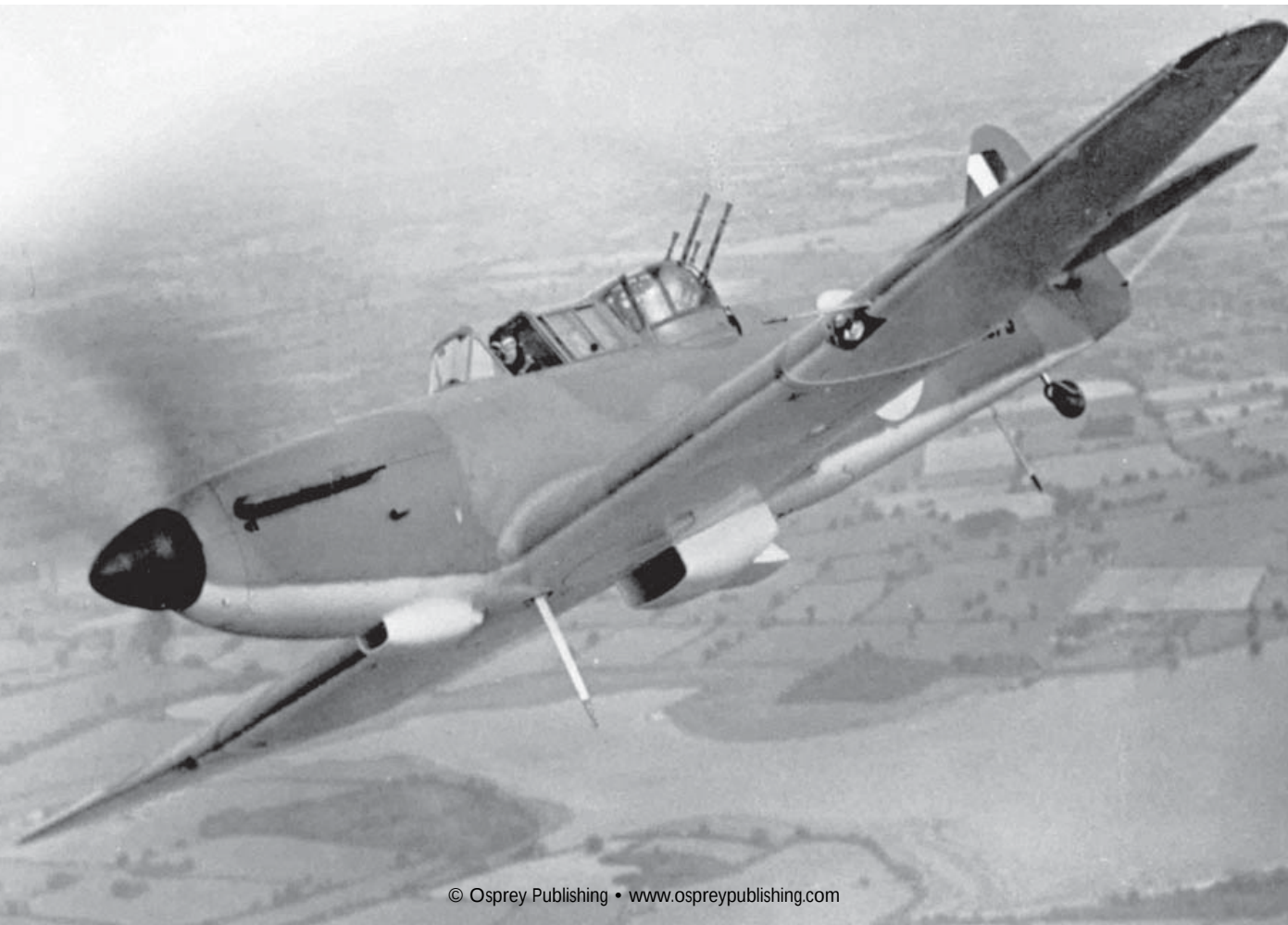


night-fighters. A Blenheim 1F scored the first AI radar success in combat on the night of 2–3 July 1940, but even with a limited run of more powerful Blenheim IVs converted to the fighter role, the type was not well suited to air-to-air combat and was replaced by more manoeuvrable aircraft such as the De Havilland Mosquito.

Bolton Paul Defiant

A low-winged monoplane, with retractable undercarriage and an enclosed cockpit, powered by a single Rolls-Royce Merlin engine, the Defiant had all the appearances of a truly modern fighter. However, what separated the Defiant from its contemporaries was its armament: its four .303in. Browning machine guns were packed in a power-operated gun turret fitted behind the pilot's cockpit. The theory was that placing the guns in a turret gave the aircraft a far greater field of fire, and allowed the pilot to concentrate solely on flying the aircraft, leaving his gunner to aim and operate the weaponry. However, the extra weight and drag imposed by the turret were nothing short of crippling – the Defiant's maximum speed was only just over 500km/h (310mph) and its manoeuvrability was poor. The Defiant scored notable successes early on in its career, with No. 264 Squadron claiming 65 enemy aircraft destroyed in May 1940. However, once German fighter pilots had stopped confusing this new type with the Hurricane it closely resembled from some angles, they learned that the Defiant could be attacked head-on or from underneath, out of range of its turret guns. In the ensuing dogfights,

Nicknamed the 'Daffy', the Defiant was a turret fighter, carrying no forward firing guns to be operated by the pilot. The concept of being able to attack formations of unescorted enemy bombers proved unsound, and the Defiant was easy prey for German fighters. (RAF Museum, P014432)



the cumbersome Defiant was easy prey, and they were withdrawn from daylight operations in August 1940, after suffering disastrous losses. Fitted with AI radar, the type fared far better as a night-fighter, although the Defiant was replaced in this role, too, by faster and more manoeuvrable aircraft, seeing out the rest of its service as a target tug or in the air/sea rescue role.

Hawker Hurricane

A low-winged monoplane with retractable undercarriage, enclosed cockpit and eight .303in. machine guns, the Hurricane was the RAF's first truly modern fighter when it entered service in December 1937. Powered by a Rolls-Royce Merlin II engine rated at 1030bhp, the Hurricane Mk 1 was capable of speeds in excess of 520km/h (320mph); the Hurricane's performance was further improved by the implementation of a variable pitch, three-bladed propeller, which replaced the two-bladed, fixed pitch propeller found on early examples.

At the outbreak of hostilities, 19 squadrons of Fighter Command were equipped with the Hurricane. It was a Hurricane of No. 1 Squadron which became the first RAF aircraft to destroy a German aircraft on the Western Front, when Plt. Off. P. W. Mould claimed a Dornier 17 near Toul on 30 October 1939. Initially, four squadrons of Hurricanes had been sent to France shortly after the outbreak of the war, but this number would double over the next few months. Combat over France would identify several shortcomings in the Hurricane's performance, and the Bf 109 outclassed it in several key aspects. While the Hurricane was a sturdy machine with a good rate of turn at low altitudes, the Bf 109 was faster, more manoeuvrable and armed with 20mm cannon to augment its 7.7mm machine guns, giving it considerably more punch. However, the Hurricane proved robust in operating from field conditions, and was more than a match for any other German aircraft in theatre. Nevertheless, nearly 200 Hurricanes were destroyed or damaged to the point of having to be abandoned in France, a huge loss for the RAF as it represented nearly a quarter of the front-line strength of Fighter Command. The Hurricane further proved its flexibility and adaptability in the Norwegian Campaign, with men of No. 46 Squadron being the first pilots to launch modern, land-based fighters from the decks of a Royal Navy aircraft carrier (HMS *Glorious*) and thus proving to the Admiralty that carrier-borne air power need not be confined to lower-performance aircraft. Furthermore, after operating successfully in the harsh climates of Norway, the squadron successfully returned to *Glorious* for recovery back to Britain. Weights were placed aft of each fighter's centre of gravity to allow harsher braking upon landing on deck, with less fear of the tail rising, as the land-based Hurricanes were not equipped with arrestor hooks.

By August 1940, Fighter Command could field a strength of 32 squadrons of Hurricanes, compared to 19 of Spitfires. The numbers in which the Hurricane were available made it perhaps the most integral part of Britain's defence; Hurricanes accounted for more confirmed kills in the summer of 1940 than all other British aircraft and ground defences combined. While the Hurricane did not have the speed and manoeuvrability of the Spitfire, its thicker wing provided a more stable platform for its machine guns, and if both RAF fighters were involved in the same combat it was a common tactic for the Spitfire to engage escorting German fighters, leaving the Hurricane to tackle enemy bombers. It was in August 1940 when Fighter Command won its only Victoria Cross of the war; Flt. Lt. J. B. Nicholson of No. 249 Squadron



The Hawker Hurricane was the first truly effective fighter employed by Fighter Command in the lead-up to World War II. Although not as fast or as manoeuvrable as the Bf 109, it was still a potent fighting machine in the hands of a skilled pilot, and more than able to hold its own in a dogfight. (RAF Museum, P005110)

remained at the controls of his badly damaged Hurricane, sustaining severe burns in the blazing cockpit, to shoot down a Bf 110 before baling out.

Hurricane development continued in 1941 with the Mk II, whose Merlin XX engine gave an increase in reliability and power. The IIB was equipped with 12 .303in. machine guns, and could carry up to 225kg (500lb) of bombs. The IIC variant replaced its machine guns with four 20mm cannon, whilst the IID was designed as a tank-buster, with two under-wing 40mm cannon pods. However, although these stages of the Hurricane's development showed a great versatility of roles, its performance continued to slip further behind that of the latest enemy fighters and its days as a dedicated fighter aircraft were numbered. The Hurricane would go on to serve in many theatres throughout the war, scoring notable successes in the deserts of North Africa and in the defence of Malta. It also performed admirably in ground attack and anti-shipping roles, as a carrier-based fighter with the Fleet Air Arm, and as an export fighter to several Allied nations.

Supermarine Spitfire

Capturing the imagination and affection of the British public perhaps more than any other aircraft of the era, the Spitfire was, in many ways, the most capable asset available to Fighter Command at the beginning of World War II. The Spitfire first entered service in July 1938, with nine squadrons being operational by the outbreak of the war. Powered by the same Rolls-Royce Merlin II as the Hurricane I, the Spitfire was faster and more manoeuvrable, possessing a performance comparable to the Bf 109. Early Spitfires were fitted with two-blade, fixed-pitch propellers and armed with only four .303in. machine guns, but improvements were quickly introduced, including the fitting of variable pitch propellers, a further four machine guns, bullet-proof windscreens and hydraulically operated wing flaps and undercarriage. The Mk IB experimented with early 20mm cannon, but was withdrawn from service following problems with jamming.

Considered too valuable an asset to be employed in France, Spitfires initially saw far less action than other types in Fighter Command, but it was a Spitfire of No. 603 Squadron that was responsible for the first German

aircraft to be shot down over Britain, when a Heinkel 111 was claimed over the Firth of Forth in October 1939. The Spitfire proved itself in combat during the Battle of Britain, where it reached such a state of notoriety amongst German aircrew that some claimed to have been damaged or shot down by Spitfires when it was actually the more numerous Hurricanes which was responsible. This opinion was even echoed at command level; at the height of the battle, when Hermann Göring asked a group of his squadron commanders what they required from him, fighter ace Adolf Galland replied 'I should like an outfit of Spitfires for my group', (although he would go on record to say he preferred the Bf 109, which he believed was faster than the Spitfire but less manoeuvrable).

By December 1940, the Spitfire Mk II had achieved operational status; the Mk II was equipped with the slightly more powerful Merlin XII, and a Mk IIB cannon variant which proved barely more successful than its predecessor. This was followed in February 1941 by the next major production variant of the Spitfire: the Mk V. The Spitfire V was strengthened significantly to absorb the power of the new 1,470bhp Merlin 45 engine, and Mk VA retained the same armament as previous models, whilst the far more numerous VB was armed with two 20mm cannon and four .303in. machine guns. A VC was also developed with a universal wing, capable of carrying either the VA or VB armament, or four cannon. The Mk V was also able to carry a drop tank beneath the fuselage to increase its endurance. The Mk V was a significant development from earlier models, now placing a more reliable cannon feed in Fighter Command's premier fighter aircraft. The Mk VB was also the first Spitfire variant to be released for overseas service, shipped on board HMS *Eagle* for the defence of Malta in March 1942.

Although less numerous than the Hurricane in the early years of the war, the Supermarine Spitfire captured the imagination of the British public. After the Battle of Britain, the Spitfire continued to develop through a myriad of variants, forming the backbone of Fighter Command in most theatres throughout the war. This Spitfire is a cannon-armed Mk Vb of No. 243 Squadron. (RAF Museum)



However, once the German Focke-Wulf Fw 190 entered service, the Spitfire was placed on the back foot. The Spitfire was forced to undergo constant developments and improvements throughout its operational life, until later marques, equipped with Rolls-Royce Griffon engines, a tear-drop shaped canopy and clipped wings, bore little resemblance to the earliest Spitfires. The RAF's last operational Spitfire mission was flown in Malaya in April 1954.

Hawker Typhoon

Designed as a replacement for the Hurricane, the Typhoon initially entered service in summer 1941, rushed to front-line squadrons in an attempt to counter the threat posed by the new Fw 190. However, the Typhoon was initially plagued with problems. Its Rolls-Royce Sabre engine was unreliable, particularly when starting in cold weather, and its poor exhaust system caused a threat of carbon monoxide poisoning to pilots so severe that they had to wear their oxygen masks immediately upon starting up. Worse still, structural weaknesses in the Typhoon caused by a combination of factors, including harmonic vibration, resulted in instances of the entire tail unit detaching, often in a high-speed dive. These problems were to greater or lesser extents solved or alleviated by a series of modifications, but the Typhoon suffered mixed reviews from those who operated it for the remainder of its service life. However, equipped with four 20mm cannon, a top speed of over 645km/h (400mph) and noted for being a very stable gun platform, particularly at high speeds, the Typhoon did achieve notable successes in combat. It performed admirably in the ground-attack role and as a low-altitude interceptor.

Bristol Beaufighter

The Beaufighter was based, in part, upon Bristol's Beaufort torpedo bomber, which in turn also had its roots in the Blenheim. Its wings, control surfaces, gear and part of the fuselage were identical to those of the Beaufort. With the outbreak of hostilities looking all but unavoidable, the Air Ministry was faced with the problem of producing as many fighters as possible in a short time. Intended as little more than an improvised long-range escort fighter/night-fighter, the Beaufighter first flew in July 1939. Powered by two 1,500bhp Bristol Hercules radial engines, the Beaufighter was capable of speeds in excess of 500km/h (320mph) and was armed with four powerful 20mm cannon in the nose, plus four .303in. machine guns in the starboard wing, and two in the port. It became clear in the early stages of the Beaufighter's life that it had ample room within its fuselage for the cumbersome AI radar kit of the period, and the 1F variant was fitted with the AI Mk IV to be used as a night-fighter.

The first Beaufighter AI kill for Fighter Command was in November 1940, but it was not until January 1941, when partnered with Ground Controlled Interception that the Beaufighter began to excel in its night-fighter role. Having performed well in the Mediterranean and Western Desert, as well as with Coastal Command, the Beaufighter was developed into several variants, with the Mk VI, equipped with more powerful 1,670bhp engines, entering service in 1942. The Beaufighter continued to serve throughout the war, finally being withdrawn from service in 1960 when the last examples had been converted into target-towing aircraft.

ON CAMPAIGN: CONDITIONS IN THEATRE

As with the majority of branches of the armed forces, the conditions experienced by the pilots of RAF Fighter Command varied hugely, depending on the theatre of war. While the living conditions would never be as hard as those experienced by their brethren in the infantry, front-line life overseas was often far from comfortable, and defending Britain from the well-equipped airfields of the home front still brought its own unique difficulties.

For pilots at the beginning of the war the prospect of being drawn into a conflict not dissimilar to that experienced by their parents' generation was a very real threat. However, in the opening days of the war very little contact



Created by Bill Hooper, Pilot Officer Prune was a cartoon fighter pilot whose escapades and buffoonery were intended to teach valuable lessons to aircrew, in a light-hearted and amusing fashion. (RAF Museum, FA02055)

with the enemy actually occurred, giving rise to the term the 'Phoney War' to describe these opening rounds. Pilots were still stationed around Britain, with little actual change in their day-to-day routines.

In September 1939 the majority of Fighter Command's pilots were based at large, purpose-built RAF airfields, such as Biggin Hill and Tangmere in No. 11 Group in the south-east, and Duxford and Wittering in No. 12 Group further to the north. Squadrons of different commands were kept on separate airfields wherever possible and Fighter Command's airfields were, owing to the performance of its aircraft, relatively simple compared to those of other commands. Airfields would often be built around four runways, the longest of which would be some 1,200m (1,300 yards) in length, and they were often grass, concrete runways being something of a rarity. Officers were given the option of accommodation in the officers' mess, although those with families often opted to live off base in their own housing. Accommodation in the mess was also variable, but most pre-war officers' messes offered single rooms with ablutions, showers and baths provided on each corridor. NCO pilots would likewise live in the sergeants' mess, their living conditions being slightly more austere than their commissioned counterparts. Large bases also had their own sports facilities, with pitches for football, rugby and cricket, and gymnasiums or tennis and squash courts – these facilities were far too expensive and time-consuming to build in the smaller airfields that were constructed after the outbreak of war.

Food, accommodation and medical and dental care were free; flying clothing was provided free of charge, although officers were expected to pay for their uniforms. The working day consisted of breakfast at one's respective mess, before being transported over to the squadron building, often on the far side of the airfield from the mess, so as to separate the noisy working areas from the accommodation area of an airfield. Squadron buildings also varied greatly from purpose-built, permanent buildings to hastily constructed Nissen huts, made up of little more than simple brick walls and corrugated iron roofing. Flying consisted of training sorties to keep essential skills current, as well as Air Tests – flying aircraft with recent repairs or maintenance to ensure that they were fully serviceable.

Evenings were often spent in pursuit of the time-honoured interests of young men in the armed forces: drinking and socialising. Alcoholic drinks were on sale in messes, but local pubs or journeys into nearby towns and cities were also popular alternatives for a change of scenery. Formalized rules governing drinking and flying were yet to be instigated, as Flt. Lt. David Price-Hughes recalled:

David was tight [drunk] at a Hunt Ball in which there was a cabaret show. One of the turns was a ventriloquist, whose act was completely ruined because David, despite violent ejection and cautious re-entry through a window, put into the dummy's mouth language that should not normally proceed from the mouth of babes... Alban... in a similar condition, went into an ice-rink to retrieve a hat. Being skateless he found the surface slippery, and the evening ended with Alban on all fours proceeding rapidly round the rink in one direction, while his fellow inebriates did likewise in the other.

Price-Hughes goes on to describe his feelings towards working with members of the Womens' Auxiliary Air Force (WAAF), at a time when female members of the armed forces was something of a rarity: 'There are some very pretty

WAAFs here, and they are hardworking and uncomplaining. Most of them are from decent families... yet, owing to some stupid regulation laid down by some idiot or idiots unknown... they are not allowed even to speak to the officers... which is damned silly and only serves to focus the attention on them more.'

He summed up the experiences of many RAF pilots in the Phoney War: 'For us at home, so far, the war has been a little vague, an affair of petty inconveniences, higher prices, blackout... but mostly second-hand news.'

The situation overseas varied markedly from these early war conditions on the home front. With the French Air Force still active, RAF squadrons sent to France were relegated to suitable fields with hurriedly erected facilities to serve as their bases of operations. Flight Lieutenant Price-Hughes recalls his first experiences of France:

The first sight of the French coastline was a thrill which was not lessened by the discovery that we were right on track... the only observable differences were the lack of hedges or any sort of division between fields, and the comparative sparseness of houses and villages... we found it difficult to locate the aerodromes, as they were nothing more than fields: no buildings save a tin hut, the only signs of activity being picketed aircraft. Having delivered our (aircraft)... a 'bus service'... took us to flight HQ in a village 1½ miles away. Squadron HQ... was 6 miles away in another village. And such a squalid village, tawdry houses, and mud, mud, mud everywhere. Our lunch consisted of bread, butter and cheese which did not suit us at all... 57 squadron told us that they are not popular with the local inhabitants... (they) believe that France is fighting for England, that the war is really for the sake of England... they render all possible assistance, but, as we saw, leave us strictly alone, and show no signs of friendliness.

Relations between French civilians and RAF servicemen supporting the British Expeditionary Force alike were unfortunately often far from cordial, as described by Flight Lieutenant James Patterson, a New Zealander.

Field conditions experienced at a typical improvised airstrip in France. The Hurricane proved robust and well capable of adapting to the rigors of life in the field, and was popular with its pilots and ground crews alike. (RAF Museum, P001858)



On arriving I did a normal circuit before landing, but noticed everything seemed so deserted until I was taxiing in, then bullets began to come whistling from everywhere about the hangars, and Frenchmen advanced, not content to cover me... but to let go every now and then at the aircraft... I was promptly searched and my revolver taken away, and with some bayonets to my back I was marched into a waiting car, driven off to Rheims and imprisoned in the Palace Royal.

After this misunderstanding was resolved, Patterson was released and returned to his aircraft, only to find one of his ground crew had been shot by a soldier serving in the French army. 'My fitter [was] groaning like hell... [he] stopped a plug of lead in his arm, a half-caste Moroccan troop did it – I felt so mad that when I got my revolver back I threatened to shoot him; finished by beating him up in front of his Captain, not strictly done but justified.'

However, experiences of France were far from universally negative. Flight Lieutenant David Price-Hughes described his accommodation once his squadron was properly established:

The billet is a farmhouse, with a high wall around, through which one passes by a heavy gateway. Geoff's room opens off mine, which is large, about 15 feet square, with a dominant light green colour. My bed is of antique design in brass, but comfortable enough, and there is no danger of suffering from cold at night. A built in cupboard, which forms a fine bookcase and wardrobe, a table in the corner on which are two tin bowls and a tumbler, a slop pail, a towel rack, and a larger table on which I am writing from the furnishings of this luxury hotel. The floor is bare, but the boards are polished. Returned to the mess for supper, and as complete sprogs were invited to sit at the CO's table... there were champagne and Vittel water to drink, and being a teetotaler I took the latter. This was not to the CO's liking and I was ordered to drink champagne... which I found not unpleasant... it is apparently a standard drink for breakfast, lunch and dinner.

While the pilots of Fighter Command were not living and working in the conditions to which they had become accustomed, there is no doubt that, for the majority of the French campaign, aircrew living conditions were far superior to those of the front-line forces in the army.

However, the conditions experienced by squadrons sent to Norway were considerably harder. After Germany invaded Norway and Denmark on 9 April 1940, No. 46 Squadron's Hurricanes and No. 263 Squadron's



GLOSTER GLADIATOR IN ACTION, NORWAY, MAY 1940

A Gloster Gladiator II of No. 263 Squadron engage a Heinkel 111 bomber over Norway in May 1940. Prior to deploying to theatre, the squadron should have had its unit identification codes removed from the fuselages of its aircraft for security purposes, but the few surviving photos of the Norwegian campaign show that this was only achieved on some of its aircraft. Number 263 Squadron operated from Bardufoss during late May and early June, with a detachment of two aircraft flying from a hastily prepared landing strip at Bodo. The squadron was involved in almost daily combat, protecting British ground forces from German bombers in poor weather conditions with barely adequate logistical support. Whilst outclassed by German fighters, the nimble Gladiator with its excellent rate of climb and manoeuvrability, proved to be an effective interceptor, and gave a laudable account of itself against enemy bombers and reconnaissance aircraft during the campaign.



Graham Turner '12

A pilot of No. 263 Squadron is photographed amid bomb damage in Bardufoss, Norway, in May 1940. This was the squadron's second outing to Norway, having sustained heavy losses the previous month. (RAF Museum, PC73-91-004)



A work party carrying out road repairs in Bardufoss. Heavy rain as well as snow proved to be a problem in maintaining adequate lines of communications to improvised RAF airstrips, well away from areas of modern infrastructure. (RAF Museum, 006)

Gladiators were moved into theatre. As Norway was covered in a thick blanket of snow, the campaign lent itself more to carrier-borne air power, rather than host nation support, but although aircraft of the Fleet Air Arm were heavily involved in the air war it was the high-performance Hurricanes of No. 46 Squadron which could potentially provide the greatest threat to the modern aircraft employed by the Luftwaffe.

As the country was still covered in a thick layer of snow, finding bases for the RAF fighters was a problem. Improvised airstrips and frozen lakes





were all that could be provided, with protection for the aircraft being made up from pens constructed by felled trees. Accommodation for pilots was, as with France, provided by locals, although the relationship with the Norwegians was by and large far more cordial: the RAF squadrons were more dependent on local knowledge and expertise to survive the harsh climate, whilst the Norwegian armed forces were in some ways less capable than those of the French, leading to a greater reliance on each other from both parties, a significant factor towards a better working relationship. The

A Gladiator Mk II of No. 263 Squadron inside a blast shelter built up of locally sourced timbers. Operating from field conditions, pilots lived and worked in very different conditions to their colleagues in Britain. (RAF Museum, PC73-91-009)



Norwegians help to move a stranded vehicle from No. 263 Squadron. Whilst pilots were subject to working in harsh conditions, they praised the bravery and hospitality of the Norwegian people they worked alongside. (RAF Museum, PC73-91-005)

local conditions did lead to their own, unique difficulties – two of No. 46 Squadron's Hurricanes crashed on landing in Norway after launching from the carrier HMS *Glorious* because of the soft landing ground, unfamiliar to many British pilots. Simple factors which had been taken for granted, such as keeping roads to and from airstrips clear, now became a full-time job after snowfall.

The move back to Britain following the campaigns in France and Norway certainly provided more comfortable conditions in many cases, but the tempo of operations presented its own problems. As the threat of German invasion was at the forefront of the nation's collective consciousness, pilots of RAF Fighter Command were now stationed across the entire country, some at main sector airfields, others at the smaller grass strips of satellite airfields. The working routine for pilots was largely similar across all groups. The day began at around an hour before dawn, with pilots having breakfast before being transported to Dispersal – the building which housed them during the working day. By this stage the aircraft had been thoroughly checked by ground crews overnight, and were being run to warm up the engines. Pilots were informed which aircraft was allocated to them for the day, which Section they would be flying in, and with whom. For many squadrons, keeping these parameters as fixed as possible was desirable. Although they all rolled off similar production lines, individual aircraft had unique handling characteristics to which pilots grew accustomed, and working with the same pilots in the same section also bred familiarity, which was vital in combat.

Having been allocated an aircraft and section, pilots would then collect their flying kit and walk out to their aircraft. The modern practice of pilots conducting a detailed walk-around was not carried out; ground crews had already completed pre-flight checks. Great care was then taken in setting out seat and parachute harnesses, and arranging kit efficiently so that take-off was as quick as possible. Oxygen masks and gunsights were also checked, and if the weather had been poor overnight pilots would assist ground crews in polishing the fighter's windscreen, as good visibility was paramount in air combat.

With the aircraft ready in all respects to scramble, pilots then reconvened at Dispersal. During the height of the battle, time in between sorties was spent



HAWKER HURRICANE Is, NO. 46 SQUADRON, FLIGHT DECK, HMS *GLORIOUS*, JUNE 1940

Hawker Hurricane Is of No. 46 Squadron land on the flight deck of HMS *Glorious* during the early hours of 8 June 1940. This feat was nothing short of remarkable for many reasons – none of the pilots were trained in deck-landing techniques, the aircraft were not fitted with arrestor hooks, a high-performance, land-based fighter of the era had never before been landed on the deck of a carrier, and the light levels were poor, making the whole procedure even more difficult. The Hurricanes were fitted with sandbags aft of the centre of gravity, so that full brakes could be applied immediately upon landing without the tail rising to cause a propeller tip strike on the deck. Squadron Leader Kenneth 'Bing' Cross led from the front, attempting the first landing. Referring to the scepticism shown to his pilots by the Royal Navy, he later said, 'We showed them they were wrong'. The tremendous skill displayed by No. 46 Squadron paid dividends to the Fleet Air Arm, who now had proof that modern aircraft could be operated successfully from aircraft carriers, and the event led directly to the development of the Sea Hurricane. Unfortunately, the success of 8 June was overshadowed by tragedy, when *Glorious* was sunk the next morning by the battlecruisers *Scharnhorst* and *Gneisenau*. 1,207 men were lost during the sinking of *Glorious*, or in the water afterwards, including eight of the ten No. 46 Squadron pilots and ten pilots of No. 263 Squadron.



GRAHAM TURNER '12



A Hurricane destroyed on the ground in France. Anticipating losses, the numerically inferior Spitfires were confined to Britain and kept out of the campaigns in France and Norway. (RAF Museum, PC79-19-749)

playing cards, chess or darts in Nissen huts or outside, reading, or for those who were able to overcome the nerves of waiting to be scrambled, sleeping in chairs or on cot beds inside the huts. The Dispersal telephone became an object of fear; each ring had the potential to be a scramble, but was often something far more trivial or mundane. When scrambles were ordered, the number of aircraft depended on the size of the raid – scrambles could be ordered by sections of three aircraft or flights of six fighters, but were often full squadron scrambles of all 12 aircraft.

After the confusion of combat, squadrons rarely returned in strength to their airfield, as they were likely to have been separated and returned in small formations or individually. Ground crews would eagerly wait for ‘their’ pilot and aircraft to return. If guns had been fired in anger, the tape over the gun ports to stop the guns freezing at altitude would now be torn, causing a distinctive whine of air across the wings as the fighters descended to land. Ground crews would quickly refuel, rearm and top up oxygen on their aircraft, turning them back round and ready to fly again in as little as ten minutes. Meanwhile, pilots would return to the crew rooms at Dispersal for debrief, giving details of any enemy engagements to the squadron intelligence officer. Not knowing when the next opportunity to eat would occur, pilots would often grab food immediately on completion of debriefing, and the squadron would be returned to readiness. The actual degree of readiness varied – if a squadron was ordered to be at five minutes’ readiness, this would necessitate sitting in the cockpits of their aircraft, fully kitted and ready to start engines. The number of scrambles per day varied greatly, but a busy day could involve up to five scrambles, although often some of these could be

false alarms or result in no enemy contact for other reasons, such as poor weather or arriving on scene too late.

The pace of operations and the constant waiting for the Dispersal telephone to ring would invariably cause strain on any pilot's nerves. For the vast majority, the overwhelming importance of the battle and loyalty to one's squadron mates was more than enough to overcome this fear, but Flt. Lt. Al Deere recalled watches being placed on 'suspect' pilots. After the initial attack, when aircraft were scattered in each direction, it was nearly impossible for squadron leaders and flight commanders to observe individual pilots, who, in an act of self-preservation, had the opportunity to flee an engagement. However, while this temptation was understandably strong, by far the greater part of Fighter Command was able to overcome it. Deere commented that the danger was strongest when fatigue allowed self-preservation to overcome the sense of duty.

The dangers of operating continuously at this pace were not lost on Fighter Command; Dowding was keen to allow each squadron one day's rest per week, but this was not always possible. The sheer pace, exhaustion and rate of casualties is highlighted in a letter by Flying Officer James 'Jas' Storrar to his father during the height of the Battle of Britain:

so much has happened I have lost so many friends and been in too much trouble not to be affected by it... 145 Squadron was practically entirely wiped out, we saw the first of the Battle of Britain and in the last 6 days took the brunt of it. You probably read of the squadron that got 21 aircraft in one day, well that was the start for us and it kept on like that until there were only four of us left and one aeroplane, so they decided that we were no longer operational, we dined with Lord Beaverbrook met the Prime Minister talked on the wireless and were finally sent up to a place called Drem in Scotland to recuperate and reform.

Whilst squadrons were rotated wherever possible out of No. 11 Group in the south-east which bore the brunt of the fighting, pilots still needed an escape after the working day which typically ended at around 8pm. Pubs were common for socializing in evenings and for those stationed near large cities, night clubs provided a popular pastime until the early hours before returning to accommodation blocks or messes for a few hours' sleep before repeating the whole daily routine.

With the onset of autumn in 1940 and the threat of invasion significantly reduced, pilots could settle down into a much more workable routine. The working day now had a later start and an earlier finish, and with the changing role of Fighter Command, including 'rhubarb' ground attack missions over occupied France as of December 1940, squadrons could now be more proactive rather than reactive in their planning cycles. Ground attack or escort missions over occupied Europe meant that pilots would now know in advance when they would be flying, leading to working routines which were far more manageable than in the dark days of summer 1940. German raids over the British mainland continued throughout the war, with Fighter Command still using RDF to scramble and intercept incoming raids, but with the more versatile role of the fighter aircraft, and the Luftwaffe changing its concentration of operations to other theatres, pilots of RAF Fighter Command based in Britain between 1941 and 1942 had more favourable working conditions.

BELIEF AND BELONGING

Men from a vast spectrum of differing social backgrounds came together to form the pilot cadre of Fighter Command. The myth that the Battle of Britain was won by a handful of ex-public school officer pilots is a complete fallacy; thousands of pilots throughout the war served in all commands of the RAF as NCOs. Just as there was a myriad of different people entering Fighter Command, so too were the reasons behind enlisting, and the personal motivation for individuals to continue flying operational sorties.

David Price-Hughes, then a pilot officer, went into some detail on his feelings towards war and his reasoning behind joining the RAF in his diary: 'Although I have neither fixed principles or beliefs, I am nevertheless logically an execrator of war as being the negation of reason, apotheosis of the principle of destruction and evil, and I find it hard, therefore, to explain to others or to myself for what reasons and from what motives I am fighting in this war. That there are things worth dying for I can no longer believe, greatly though I should rejoice to find myself wrong.'

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DISPERSAL, A FIGHTER SQUADRON OF NO. 11 GROUP, SEPTEMBER 1940

The 'old hands' are able to catch up on a little sleep between sorties or try to relax over a game of chess, while the newer pilots nervously smoke or sit in silence, waiting for the telephone to announce the next scramble. Most pilots wear their 'Mae West' life jackets but leave their helmets and parachutes by their aircraft. Running to the aircraft was extremely awkward when the parachute was worn properly. The squadron CO stands in the doorway, reviewing a report of the last intercept (1). 'B' Flight's leader, a New Zealander flight lieutenant (2), plays chess with his wingman, a naval officer on attachment from the Fleet Air Arm (3). Two Polish pilots stand together (4), further evidence of the lengths taken by Fighter Command to bolster its numbers from outside its normal pools of recruitment. The table below illustrates the diversity of backgrounds employed by Fighter Command during the Battle of Britain, although the numbers still show the vast majority to be of British origin.

Nationalities of Pilots and aircrew	Number taking part in the Battle	Number Killed
United Kingdom, including Commonwealth who cannot be identified separately	2,365	397
Fleet Air Arm	56	9
Australian	21	14
New Zealander	103	14
Canadian	90	20
South African	21	9
Southern Rhodesian	2	0
Jamaican	1	0
Irish	9	0
American	7	1
Polish	141	29
Czech	86	8
Belgian	29	6
Free French	13	0
Palestinian	1	0
Total	2,945	507
Approximate number of wounded – all nationalities		500
Total casualties – all nationalities		1,007

Price-Hughes goes on to describe his feelings towards the enemy and what motivation he has been able to find:

I have no hatred of Germany, quite the reverse: that perverse streak in my nature which causes me inevitably to react counter to popular opinion has led me to prefer Germans as an abstract mass to Englishmen. Why therefore am I fighting? The mainspring of my actions can, I think, be found in my vanity. I have an overwhelming desire to be the centre of attraction... at the end of the war I see a figure standing, upon his left breast rows of medals I see this hero returning in triumph from the war, feted by all as a reincarnation Rudolph Valentino, the cynosure of all eyes.

Whilst Price-Hughes' viewpoint gives but one account, an opposite view is described by Flying Officer James 'Jas' Storrar in a letter to his mother during July 1940, written in several sittings during a busy period of operations at the beginning of the Battle of Britain.

It was the convoy and we got there too late... [the German aircraft] got one of our chaps, but worst of all they sank these ships blast them and we arrived to find them sinking and people wallowing about in the water. It makes me even more realise the utter futility of war, and Oh God it makes me so wild that I could scream when you see things like that. I'd like to shoot every German there is, alone [they're] alright but as a nation they are cowardly bullying swine, and I hope that I have the good fortune to shoot down many more.

Storrar, understandably emotional in his response due to his own experiences and the fatigue of a busy period of operational flying does, however, give a very different viewpoint of the enemy once he meets a German aviator face to face: 'I helped shoot down another Dornier this morning. We got the pilot

Pilots of No. 601 Squadron wait to be scrambled at RAF Tangmere. Darts, chess and other games requiring little in the way of facilities proved to be popular distractions for pilots nervously waiting for the Dispersal telephone to announce a scramble. (RAF Museum, PC98-173-171-17A)



into the mess he was absolutely green with fright to start with. I think he thought he was going to be publicly tortured. He was quite a young chappie quite decent really but very fed up with the war.'

Storarr also gives a fascinating look into the feeling of belonging within the fighter pilot fraternity within the same letter home:

I have noticed army captains look upon my dirty tunic and hat as I went into the Euston Hotel the other day with disgust and two waiters twitter about something in my dress, if they only knew how they amused me they'd think again. It is honestly amusing to meet people and be introduced as a fighter pilot, the different reactions are amazing, some think I reckon that a chappie who flies Hurricanes must be a golden-haired Adonis it rather startles them to meet nothing more than a boy, too fat to be well built too young to be able to control himself, far too dirty and untidy looking to be a figure in the public's eye but nevertheless a fighter pilot, and typical of them all.



A fighter pilot reads a book in between flights. Behind him are recognition posters. In the confusion of air-to-air combat it was all too easy to mistake a friendly aircraft for that of a foe. The first fatality suffered by Fighter Command during the war was when a Spitfire of No. 74 Squadron shot down two Hurricanes of No. 56 Squadron on 6 September 1939, resulting in one fatality, and tragically, the Spitfire's first recorded kill. (RAF Museum, PC98-173-213-1)



Facial burns suffered by a pilot of Fighter Command in the summer of 1940. The Hurricane was notorious for cockpit fires, resulting in the phrase 'Standard Hurricane Burns' being applied to the injuries of many unfortunate pilots. The renowned plastic surgeon Archibald McIndoe and his staff worked tirelessly with RAF aircrew to advance the science of plastic surgery and improve their treatment and rehabilitation. (RAF Museum, PC95-54-7)

This view ran directly against the stereotype of the fighter pilot, although this common misconception was not only a hang-up from the previous war, but also something more Germanic. The RAF entered World War II with a similar attitude to that of World War I; personal motifs on aircraft were strictly forbidden, and for Fighter Command the term 'ace' was not officially recognized, although it was believed by most to be any individual with five confirmed kills or more. By 1940, adding a row of kills in the form of Iron Crosses or swastikas beneath the cockpit of one's fighter was more commonplace, but certainly not the norm. Some pilots even began to adorn their aircraft with the name of their wives or girlfriends, or even full nose art, as famously adopted by No. 242 Squadron. However, these personalized touches never became as popular as in German or American Air Forces, partly because individual aircraft frequently changed hands within a squadron as opposed to being assigned to individual pilots.

The severity of the nation's situation was not lost on the pilots of Fighter Command, and many believed so strongly in their cause that they were willing to make the ultimate sacrifice

for it, even consciously so. Flying Officer Ralph Hope was killed during the Battle of Britain – his final action was described in a letter to his family by Flight Lieutenant Archibald McKellar:

he died, quite literally giving his life for others. His plane was shot out of control over a thickly populated area and he could have baled out with every chance of success. This, though, would have meant the machine crashing where it pleased, in a factory, shop, private house or anywhere, and rather than take this risk, on behalf of the people he chose to take the risk himself, and attempted a forced landing in a large field of allotments. The plane however dived out of control before he effected the landing. Ralph was thrown clear, but it was too late for the parachute to function. It is a consolation to know that this grand action was successful: the plane did crash in the allotments and no one was injured.

Fighter Command's aircrew not only consisted of a cross-section of British society, but also included men from nations of the British Empire. The ranks were joined by pilots from Australia, New Zealand, Canada and South Africa, eager to help stop the Nazi advance in Europe before it threatened their own homelands. Other pilots had already experienced the German advance first hand – men from Poland, Czechoslovakia and France who were fanatical in their hatred of the German foe and only too happy for the opportunities afforded to them by the RAF: a modern fighter aircraft and the chance to engage the hated enemy.

EXPERIENCE OF BATTLE: TACTICS OF AIR COMBAT

The outbreak of World War II saw RAF Fighter Command poorly placed in terms of air combat tactics. Air-to-air combat had not been practised in anger since World War I, and many of the most valuable lessons learnt via the trial and error of dogfighting had been lost during the inter-war period. Aces of the RFC and RNAS had learnt that agility was one of a fighter's greatest strengths, and that being free to manoeuvre aggressively was key to success in combat. The initial, tight formations flown in World War I were now unnecessary – pilots of the earlier conflict needed to fly in close formation so that each element leader could give hand signals to his wingmen. By the late 1930s, with most modern combat aircraft equipped with radios, fighter leaders could now easily instruct their wingmen on how to attack.

However, the advantages of a fighter being free to manoeuvre had been completely forgotten, and tight formation, which constrained this freedom, was no longer necessary. Coupled with an ignorance of the tactics and capabilities of a potential enemy – the Luftwaffe – this further forced Fighter Command's doctrine in the wrong direction. The common belief was that German fighters such as the Bf 109 did not have the endurance to escort bombers over Britain; therefore, the obvious tactic open to the Luftwaffe would be to mass their bombers together in close formation so that their defensive armaments would provide interlocking arcs of fire. In theory, then, the best way to attack these formations would be to use similar tactics, keeping fighters locked together in their own tight formations to amass their firepower.

Consequently, RAF fighter pilot training did not dwell for too long on high-energy manoeuvring or gunnery – these skills were considered secondary to close, accurate formation flying. Even after experience in the opening months of the war, Fighter Command published a document in 1940 that

A flight scramble – six pilots race to their aircraft. Depending on the size of incoming raids or the availability of crews at individual squadrons, scrambles could be ordered in section, flight or full squadron strength. (RAF Museum, P031732)



attempted to standardize formation attack tactics to be employed against enemy bombers. Updated by the opening rounds of the Battle of Britain, the document gave six standard attack profiles:

No 1: An attack from Dead Astern and from Above Cloud

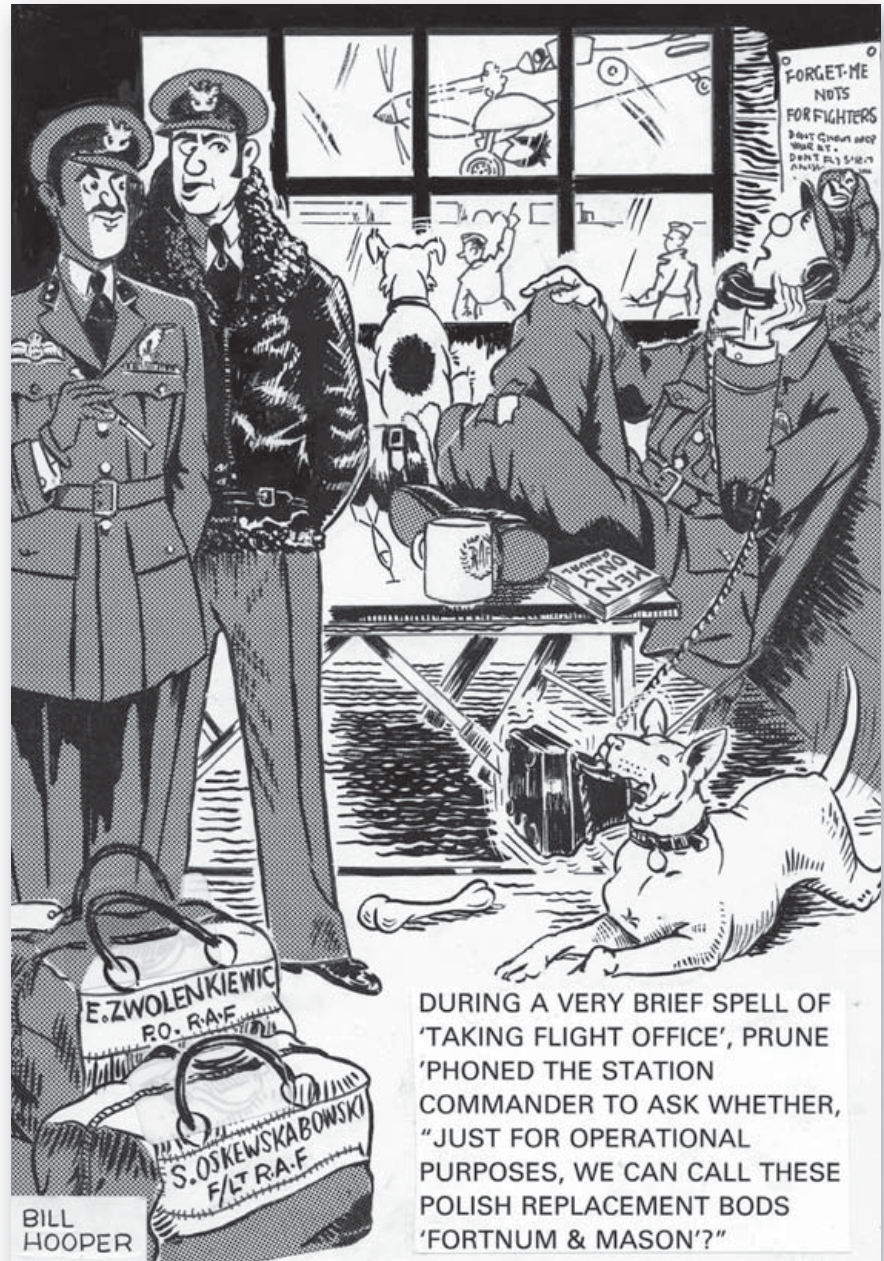
No 2: From Directly Below

No 3: (From Dead Astern) a.) Approach Pursuit, b.) Approach Turning, From Above Cloud

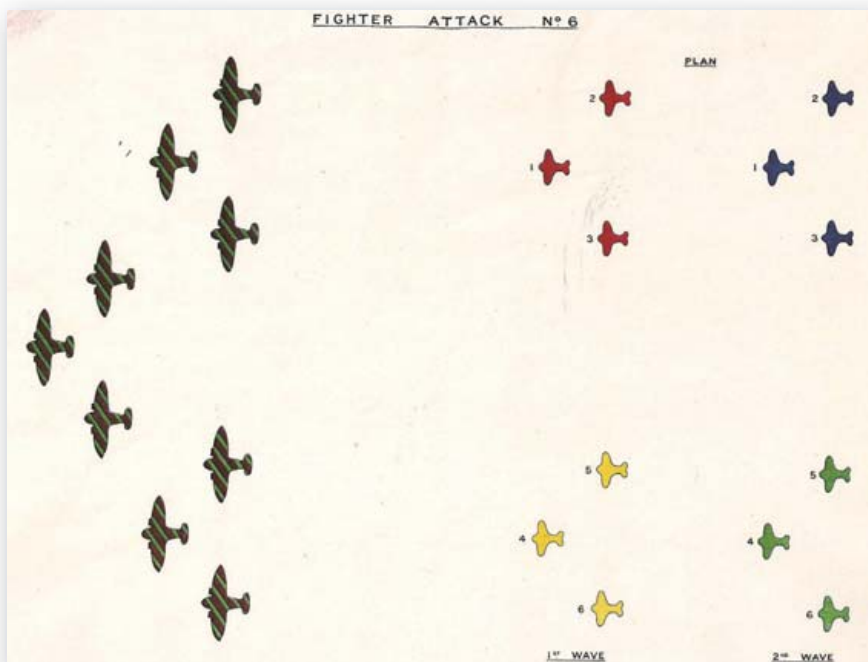
No 4: (From Directly Below) Two Types of Approach

No 5: (From Dead Astern) Two Types of Approach

No 6: (From Dead Astern) Two Types of Attack



The cartoon Pilot Officer Prune comments wryly on the communication barrier with foreign pilots serving in Fighter Command. While the extra numbers, determination, skill and experience of foreign pilots made a welcome addition during Fighter Command's most desperate hour, there were still significant obstacles to overcome in terms of language difficulties and differing operating procedures. (RAF Museum, FA02054)



The hugely unwieldy Fighter Attack Number 6. British fighters approach their targets in close formation, opening fire under the command of Section Leaders. These tactics proved completely unworkable under real combat conditions. (RAF Museum)

These profiles depended on sections of three fighters flying in either a tight 'vic' formation (an arrowhead with the leader flying centrally and slightly ahead of his two wingmen), line astern formation, or quickly being able to change between the two. As well as almost completely inhibiting the ability of the fighter pilot to use the agility of his aircraft, a second problem occurred. Only the leader was concentrating on lookout – formations were so tight that the second and third aircraft in each section were concentrating on maintaining their positions in formation and on not colliding with their wingmen, rather than checking the skies for enemy aircraft. This vastly reduced the capability of the section not only to find enemy aircraft, but also to defend themselves from being jumped by enemy fighters.

The attacks themselves were flown 'by numbers,' with the section leader calling instructions, which would be executed on the word of command 'Go,' e.g. 'Number One Section, Form Vic, Go,' and even 'Number One Section,

Spitfires of No. 19 Squadron formed up in 'vics' of three aircraft. Devised during World War I, the 'vic' was developed to allow the two wingmen to see visual signals from the cockpit of the lead aircraft, a function which was unnecessary by 1939. As only section leaders could keep a good look-out, one proposed solution was to have one vic weaving behind the rest of the squadron to act as a rearguard. German pilots dubbed this *Idiotenreihen* ('rows of idiots') as they proved to be such easy pickings. (RAF Museum, X003-2674-0802)



Gun camera footage of the final moments of a Junkers 88 bomber. In the confusion of combat it was all too easy for two pilots to claim the destruction of the same enemy machine without any idea of the other pilot opening fire on their target. Gun cameras helped to alleviate this problem and give more accurate results on the actual damage being inflicted on enemy aircraft. (RAF Museum, P011465)



fire, Go'. This removed the initiative from other pilots, even over the choice of when to open fire on the enemy.

As well as limiting manoeuvrability and situational awareness, the six standard attacks were all based on two incorrect assumptions. First, that enemy bombers would not be escorted by fighters – RAF fighters were immediately placed at a dangerous disadvantage by the lack of flexibility in their tactics. Second, the attacks assumed that German bombers would not take evasive action, and that their return fire would be ineffective. Several of the attacks had RAF fighters attacking from the six o'clock high position, directly in the path of the bombers' dorsal gun; all the attacks called for RAF pilots to shoot from dead astern, although in theory the standard attacks called for RAF pilots to shoot from outside the range of a bomber's defensive armament. In practise, this was very often not the case; the attacks called for RAF fighters to present the bomber with a no deflection shot – if attacking from the side or at an angle, the gunner would have to deflect – to aim ahead of the fighter and shoot at a space which would be occupied by the target by the time the bullets arrived. These no deflection shots presented bomber gunners with little challenge. Perhaps worst of the standard attacks were No. 2 and No. 4, both from directly below. These called for RAF fighters to close with their target from the six o'clock low position, before climbing steeply behind, reducing their speed in the process and presenting the German bomber's ventral gunner with a slow-moving, no deflection target.

Fortunately, the standard attacks saw very little use in combat. RAF squadron leaders generally had the experience and initiative to completely ignore the prescribed doctrine and take responsibility for the tactics of their own individual squadrons. Perhaps the most famous example of this was *Ten of My Rules for Air Fighting* by Adolph 'Sailor' Malan, who commanded No. 74 Squadron in August 1940. His *Ten Rules* were not only so popular that they were published as a poster for displaying at all Fighter Command stations, but are also in some places still practised by fighter pilots today.

Wait until you see the whites of his eyes. Fire short bursts of 1 or 2 seconds and only when your sights are definitely 'ON'.

Whilst shooting think of nothing else, brace the whole of the body, have both hands on the stick, concentrate on your ring sight.

Always keep a sharp lookout. 'Keep your finger out'!

Height gives You the initiative.

Always turn and face the attack.

Make your decisions promptly. It is better to act quickly even though your tactics are not the best.

Never fly straight and level for more than 30 seconds in the combat area.

When diving to attack always leave a proportion of your formation above to act as top guard.

INITIATIVE, AGGRESSION, AIR DISCIPLINE and TEAM WORK are words that MEAN something in Air Fighting.

Go in quickly – Punch hard – Get out!



This development followed a similar pattern to that of tactics in the Luftwaffe; German pilots flying with the Condor Legion during the Spanish Civil War had initially relied on similar, tight formation flying tactics. Experience over Spain soon proved the advantages of a much looser formation, leading to the development of the *Schwarm* (swarm). The *Schwarm* of four aircraft consisted of two *Rotte* or pairs – the leader of the first pair flew with his wingman slightly above and behind to one side, while the second pair flew further back still. As soon as combat began, the *Schwarm* could easily break down into two pairs, with the leader free to engage enemy aircraft, knowing that his wingman was behind him with the sole purpose of covering his back. According to aviation historian Mike Spick, four out of five victims never saw

Adolph Malan was a South African pilot whose pre-war experience in the Merchant Navy earned him the nickname 'Sailor' Malan. Considered by many of his contemporaries to be more a gifted marksman and tactician than a pilot, his *Ten Rules of Air Fighting* were disseminated throughout Fighter Command. (RAF Museum, P001357)



A pilot looks over the emblem on the rear fuselage of a downed Bf 109. While the Bf 109 had been tested and blooded during the Spanish Civil War, the Hurricanes and Spitfires of Fighter Command were more than able to meet the German machine on equal footing. (RAF Museum, P024711)

Spitfires of No. 222 Squadron are scrambled from RAF Hornchurch. Aircraft took off together in an attempt to expedite their departure and formed up in strength as quickly as possible once airborne. (RAF Museum, P008701)



Pilots of No. 92 Squadron in their Ready Room at Biggin Hill. As the Battle of Britain dragged on, squadron commanders were faced with the problems of training new pilots to an adequate standard whilst attempting to take pressure off their fatigued veterans. (RAF Museum, P007990)



their attacker until it was too late in fighter-on-fighter combat, leading to the necessity for loose, flexible formations, which allowed every pilot to keep an optimal lookout.

Whilst RAF Fighter Command persisted with 'vics' of three aircraft from the outbreak of hostilities and throughout the Battle of Britain, veteran British pilots soon saw the merits of the *Schwarm* and adopted the system for their own squadrons. In British hands, the *Schwarm* was named the 'Finger Four', based on its resemblance to the tips of four fingers on an outstretched hand. Flying Officer 'Johnnie' Johnson recalled still flying 'those wretched (standard) attacks' for practise as late as January 1941, but by this point the

A No. 601 Squadron flight lieutenant updates the B Flight Readiness Board at RAF Tangmere. As far as possible, individual pilots were kept in the same position within the same section to foster teamwork and familiarity. (RAF Museum, PC98-173-171-25)



dark shell bursts, helping friendly fighters to identify targets from much further away. Other ground-based defences included barrage balloons over built-up areas to discourage enemy aircraft from low flying, as described by Flying Officer 'Jas' Storrar in a letter to his father: 'a Ju 88 flew across my nose I immediately set foot after him and began squirting. Suddenly, much to my surprise, his wing was torn off as he flew into a balloon cable and I suddenly realised I was slap in the centre of a balloon area. I dodged them however and got home.'

Combat experience also changed gun harmonization. Before the war, the standard practise for Fighter Command was to adopt the 'Dowding Spread' – Dowding believed that his fighters were very unlikely to have to shoot at enemy fighters and so dictated that the standard practise would be for eight-gun fighters to have their guns harmonized to a wide spread of fire set

Often not receiving the recognition they deserved for their vital contribution, members of the Observer Corps provided crucial information on the movements of enemy aircraft once they had crossed the coastline and were no longer tracked by RDF. In 1941 the unit received recognition and a change of title to the Royal Observer Corps in acknowledgement of their assistance to Fighter Command in the Battle of Britain. (RAF Museum, X001-2706-003)



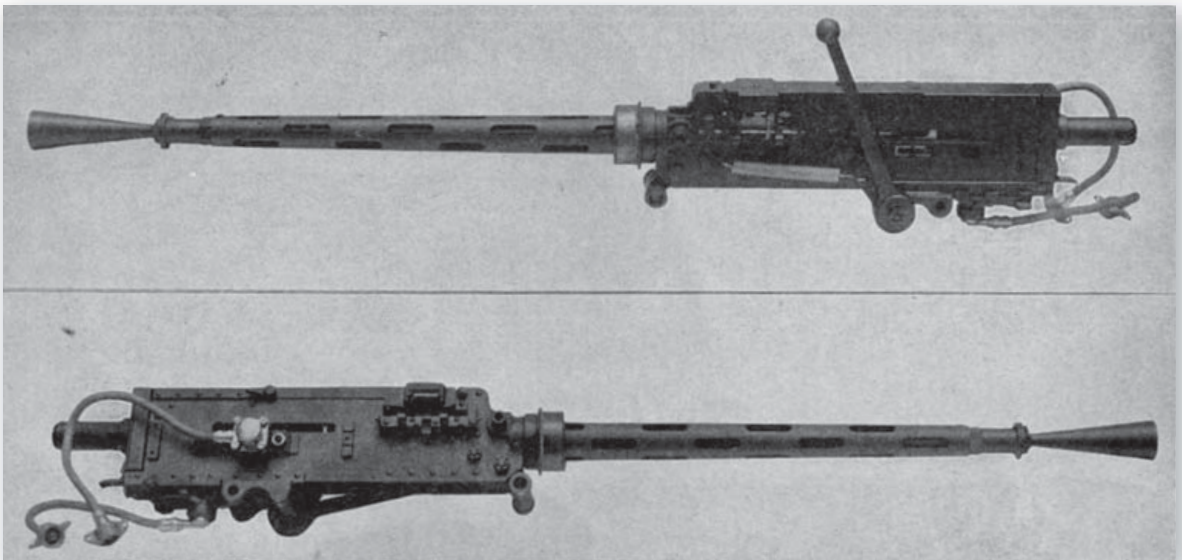


A Bf 109 flies dangerously close to a barrage balloon. Barrage balloons were a cheap and effective method of deterring or even destroying enemy aircraft over built-up areas. (RAF Museum, PC94-152-12)

some 365m (400 yards) out. The reasoning behind this was first, to keep the fighter outside the effective range of bombers' defensive armaments, and second, to compensate for the poor standards of gunnery displayed by fighter pilots in training in the inter-war period, irrespective of the fact that they were not given the correct degree of gunnery instruction. The theory was to produce a wide enough bullet pattern to ensure that at least some bullets hit the target, in a 'spray and pray' mentality rather than relying on accurate gunnery. This method would compensate for poor gunnery but would still leave a density of fire lethal enough to down an aircraft.

As early as spring 1939, No. 1 Squadron had conducted their own experiments with harmonizing their guns to converge on a point only 230m (250 yards) in front of the aircraft. When No. 1 Squadron's Hurricanes saw action in France, their theories yielded dramatic results – Paul Richey

The Browning .303in. machine gun armed the majority of Fighter Command's aircraft in the early stages of the war. Firing the same calibre round as British aircraft in World War I, the .303 Browning was replaced by .50in. machine guns and cannon in fighter aircraft later in the war. (RAF Museum)



recorded in his memoirs that his squadron had destroyed over 100 enemy aircraft for the loss of only three of their own pilots killed, two wounded and one captured. Much of this was put down to the subject of gun harmonization, and the 'Dowding Spread' was abandoned in favour of guns being harmonized to a focal point much closer in.

The results of the change of gun harmonization, and the sort of combat fighters were actually involved in, is highlighted in this extract from a No. 602 Squadron Intelligence Patrol Report from 6 September 1940: 'B Flight was attacked shortly after Squadron started to pursue e/a [enemy aircraft] by Me 109s which had not been observed by them. Only one pilot Green 3 (Sgt. Proctor) was able to fire, all pilots of "B" Flight being taken by surprise. Green 3 attacked from quarter astern one Me 109 which had manoeuvred Green 1, 10 seconds burst 250 yards and destroyed it; he also attacked second Me.109 without observed results.'

In many cases, combat was reported at even closer ranges, as in this report from Sqn. Ldr. Douglas Bader of No. 242 Squadron from 7 September 1940, which highlights just how quickly squadrons were actually broken up in combat, making the formalized squadron attacks all but useless:

E/a were proceeding North over the estuary. Result of chase was that squadrons got spread out, but it was essential to engage quickly. Turned left to cut off enemy and arrived on the beam slightly in front with Red 2 (Sub Lt. R. J. Cork, Fleet Air Arm) only. Gave a short beam squirt at about 100 yards at e/a who were flying in sections of 3 line astern in a large rectangle. Turned with Red 2 (who fired with me) and sat under the tails of the back section at about 100 yards to 50 yards, pulling up the nose and giving short squirts at the middle back aeroplane. This aeroplane started smoking preparatory to catching fire; (a Me 110) but before I could see result, I noticed in the mirror a yellow-nosed Me 109 on my tail slightly above, as I turned there was a big bang in the cockpit from an explosive bullet which came in through the right hand side of the fuselage, touched the map case, knocked the corner off the undercarriage selector quadrant and finished up against the petrol priming pump.... The attack by 19, 310 and 242 Squadrons would have been more effective and successful had the Wing been at 25,000 feet. The element of surprise was lost to us, and the full throttle climbing to get level with the enemy formation made the whole fighter formation straggle out so that the attack could not be pressed home with the weight of 36 aeroplanes.

F

DOGFIGHT OVER SOUTH-EAST ENGLAND, SEPTEMBER 1940.

Spitfires of No. 72 Squadron from Biggin Hill attempt to break up defending Bf 109 fighters, allowing Hurricanes of No. 79 Squadron, also from Biggin Hill, to tackle the bombers. German fighters have entered combat in *Schwarms*, and split into *Rotte* or pairs to engage the Spitfires of No. 72 Squadron. Having learnt much from the opening rounds of the battle, the British fighters have abandoned the cumbersome Fighter Command attacks, but still use the inferior 'vic' formations in combat. The pilot of one damaged Spitfire is trapped inside his cockpit, which is now ablaze. Many pilots were so concerned about suffering such a fate that they flew entire sorties with their canopy open to aid egress in an emergency. The Hurricanes are engaging a formation of Dornier 17s. They attack from the flanks, sweeping quickly across the German formation to fire short bursts before escaping the mass of concentrated defensive fire from the Dorniers. These tactics made it more difficult for German gunners, who had little time to line their sights up on the fast-moving attacking fighters. The bombers are forced to stay in close formation in the hope that their interlocking arcs of defensive fire will be enough to deter the Hurricanes, but in practice bombers were far easier to deal with once the escorting fighters were occupied.



The opening page of a combat report by Douglas Bader in September 1940. These reports were filled in after every combat to keep a thorough and accurate record of the effectiveness of operations. (RAF Museum, bader004-2)

Pilot 5/1/69

COMBAT REPORT. R.A.F. Form 1159
FORM F
1226

Sector Serial No. _____ (A) 51

Serial No. of Order detailing Flight or Squadron to _____ (B) 62

Patrol _____

Date _____ (C) 7/9/40.

Flight, Squadron _____ (D) Flight: ~~Lead~~ Sqdn.: 242.

Number of Enemy Aircraft _____ (E) Attacked about 40.

Type of Enemy Aircraft _____ (F) Danig 24507 ME 109 + 110.

Time Attack was delivered _____ (G) About 17.35 LK.

Place Attack was delivered _____ (H) Roughly between N. HEALD & CHEDDAR + BENTWOOD

Height of Enemy _____ (J) 20,000 Ft.

Enemy Casualties _____ (K) Destroyed 2. Conclusive. Probable 0. Inconclusive. Damaged. 0.

Our Casualties _____ Aircraft 5 damaged (L)

Personnel NIL (2 hurt) (M)

1 Missing. (N)

GENERAL REPORT

Searchlights. (Did they illuminate enemy; if not, were they in front or behind target?) (N) (i) N/A

A.A. Guns. (Did shell bursts assist pilot intercepting the enemy?) (N) (ii) YES.

Range at which fire was opened in each attack delivered _____ (P) 1) 2 sec. full beam. (100 yards).

on the enemy together with estimated length of burst _____ 2) 2 sec. dead aim. (50 yards).

3) 2 sec. dead aim. (100-50 yards).

4) 2 sec. " " " " " "

5) 2 " " " " " "

GENERAL REPORT Wing ordered off from (R) Duxford at approximately 16.45 hrs. to patrol N. HEALD at 10,000 ft.

Missing at N. HEALD at 15,000 ft. noticed A.A. fire to the East

saw a number of E.A. at 20,000 immediately ordered Duxford

and obtained permission to engage. Opened fire to 674 foot

Signature _____

O.C. { Section, Flight, Squadron } Squadron No. _____

(1611) WL 33216-2323 400 Pads 12/38 T.S. 700

Bader's last paragraph referred to another tactical issue that would prove hugely controversial within Fighter Command: the Big Wing theory. Air Vice Marshall Keith Park, AOC No. 11 Group in the south-east of England, considered his priority to be breaking up enemy bomber formations as efficiently as possible before they reached their targets. To do this, he proposed: 'engag(ing) the enemy high-fighter screen with pairs of Spitfire squadrons from



Hornchurch and Biggin Hill half-way between London and the coast (with)... Hurricane squadrons from London Sectors to attack bomber formations and their close escort before they reached the line of fighter aerodromes East and South of London. The remaining squadrons from London Sectors which could not be despatched in time to intercept the first wave of the attack by climbing in pairs, form... a third and inner screen.'

Park was supported in his choice of tactics by Air Vice Marshall Quintin Brand of No. 10 Group to the west, who detailed his controllers to consult with No. 11 Group before standing down any of his own fighters which came to No. 11 Group's assistance. The same degree of cooperation was not afforded by Air Vice Marshall Trafford Leigh-Mallory, AOC No. 12 Group to the north. Leigh-Mallory preferred to attack in force, taking time to assemble his squadrons into 'Big Wings' of at least three squadrons, then carrying out an attack with more punch, even if that meant attacking retreating enemy bombers after they had dropped their payload on Park's airfields in No. 11 Group. Dowding himself stated that he was in favour of using fighter formations in the greatest strength available, and had Park replaced as AOC No. 11 Group in December 1940 by Leigh-Mallory.

By 1941, 'Big Wing' was the favoured tactic, although German tactics had now shifted to favour large-scale raids by night, and only small-scale attacks during daylight hours. The development of Ground Controlled Interception (GCI), which became operational in January 1941, helped to combat the night raids. While the AI radars fitted to night-fighters were of great benefit, they were still relatively short-ranged and the far superior service granted by GCI could now vector a night-fighter into the right position to execute an interception by itself. Before this, the main aid for the

Squadron Leader Douglas Bader by the nose art of his Hurricane whilst serving on No. 242 Squadron. Whilst nose art was discouraged by the upper echelons of Fighter Command, it became more common as the war progressed. (RAF Museum, PC94-131-23)

Commander of No. 12 Group during the Battle of Britain, Air Vice Marshall Trafford Leigh-Mallory was one of the main instigators of the 'Big Wing' theory. He was later appointed Commander-in-Chief of Fighter Command and air commander for the invasion of Normandy before being killed in a crash whilst being transported to Ceylon as C-in-C South-east Asia Command. (RAF Museum, X003-8417-2)



night-fighter pilot from the ground was simple searchlights and AA guns to guide him on to his target. Many German pilots remained undeterred by AA guns at night, but they provided a good visual cue for hunting British fighters.

By July 1941 there were 17 GCI stations feeding information to 16 dedicated night-fighter squadrons, giving a more substantial coverage over Britain during the dark hours, although it was still a far from perfect system. Nonetheless, interceptions were becoming more commonplace, even amongst non-AI fitted fighters. The highest scoring night ace of the early years of night-fighting was a Hurricane pilot, Flt. Lt. Richard Stevens. Stevens, an inter-war

airline pilot, famously returned from one successful night interception with blood and the remains of one of his victims having caused some slight damage to one of his wings – he ordered his ground crew to leave it in place as a reminder of the daughter he lost to German bombing during the Blitz.

One of the primary reasons for the Luftwaffe's shift in tactics from day bombing to the night offensive was the planned invasion of Russia, which necessitated withdrawing much of its air power from the Western Front. As a result, RAF Fighter Command was now able to shift its focus to offensive operations.

Offensive operations by Fighter Command had begun as early as December 1940, when a Fighter Command order called for Sector Offensive sweeps over Northern France and Belgium, to harass enemy units and show them that operations in occupied Europe would be met with opposition. 'Mosquito' operations consisting of single fighters, sections or flights were tasked with raiding predesignated targets, or targets of opportunity over northern Europe – in January 1941, the code name of this operation was changed to 'Rhubarb'. Alongside 'Rhubarb' missions, 'Ramrod' sorties involved escorting small numbers of bombers to destroy specific targets. At the opposite end of the scale were 'Circus' missions, involving large numbers of fighters and bombers with the intention of drawing out enemy units for combat.

These offensive sweeps not only resulted in air combat, but now also involved targeting enemy ground forces, as described in these extracts from a Rhubarb Report from No. 118 Squadron on 11 October 1941:

unable to locate the 'Rhubarb' Target owing to very bad visibility they observed what was apparently a motor transport depot in the Merville area. There were a large number of camouflaged military trucks and crowds of soldiers apparently dressed in brown outside the building. The soldiers dispersed rapidly as Red 1 and Blue 2 fired two short bursts of cannon and machine gun fire from 150 yds at a height of 50 feet at the building and yard. There were two columns of smoke rising from the building as our A/C flew away and military lorries were probably damaged. Before A/C continued towards Montebourg they saw a stationary goods train with 20 trucks at Montebourg Station. Red 1 fired a short burst of cannon and machine gun at the engine, the driver jumped out of the cab and the engine was covered in steam and smoke, many hits being registered on the boiler resulting in a definite explosion. Blue 2 fired cannon and machine gun then flew along the engine and trucks two of which at least were set on fire. Red 1 and 2 and Blue 2 made a further attack, Blue 1 orbited during the attack.

The offensive sweeps into occupied Europe continued through 1941 and 1942, as did the already established roles of defending Britain, both during the day and at night. Fighter Command was involved in other roles throughout this period of the war, including shipping defence, both from shore bases and from the Merchant Ship Fighter Unit, which manned converted Hurricanes to be flown off catapult rails mounted on merchant shipping. With nowhere to land, the pilot would either parachute out of his Hurricane after intercepting his target, or attempt to ditch near friendly shipping. These aircraft were operational by June 1941, with Hurricanes chasing away a Fw 200 Condor patrol aircraft in November of the same year, and confirming the unit's first kill in May 1942.

MUSEUMS AND SURVIVING AIRCRAFT

For the avid enthusiast, the single best source of further information and surviving airframes of the period is the RAF Museum, Hendon. Located in North London, the actual site has links to aviation dating back to the 19th century, and covers all aspects of the history of the RAF. In terms of the period in question, the museum houses a large collection of photographs, the flying clothing and uniform described, plus an extensive archive of personal artefacts from the era, available for viewing by appointment.

Hendon has several notable examples of wartime RAF Fighter Command aircraft. K8042, a second-batch Gloster Gladiator built in 1937, initially served with No. 87 Squadron at RAF Debden. It was later utilized at Boscombe Down and 61 OTU, but is currently preserved in its original No. 87 Squadron colours. Hawker Hurricane P2617, a veteran not only of the Battle of France and a great deal of operational flights based out of England, but also the star of several famous post-war movies, now sits in the Battle of Britain Hall in the colours of No. 607 Squadron. X4590. A Supermarine Spitfire I, first entered service in late 1940 with No. 609 Squadron at RAF Middle Wallop. This aircraft was involved in the shared kill of a Ju 88 on 21 October 1940, and now sits alongside the Hurricane P2617, both veterans of the early years of Fighter Command.

BL614 is a later Spitfire, a Vb, which entered service in 1941 and flew extensively on operations from the UK until 1943, and is also a veteran of the movie *Battle of Britain* made between 1967 and 1968. Hendon also houses what is believed to be the world's only surviving Hawker Typhoon. MN235 entered service in 1944, and was shipped to the USA for fighter comparison trials, returning to the UK in 1967. A late-war TF Mk X variant of the Bristol Beaufighter is also on display; RD253 entered service in 1944 with the Portuguese Naval Air Arm, before being presented to the RAF for restoration in 1965.

Hendon also houses not only training aircraft of the period, such as a De Havilland Tiger Moth, but also several wrecked and salvaged aircraft of the era, and an impressive collection of German and Italian aircraft.

RAF Museum London, Grahame Park Way, London, NW9 5LL

Tel: 020 8205 2266

<http://www.rafmuseum.org.uk/london>

Cosford Air Museum in Shropshire also houses an impressive collection of displays, photographs, uniforms and flying clothing of the period. On display is K9942, a Supermarine Spitfire I, which was one of the first to fly in 1939, before participating in over 30 operational sorties. A wheels-up landing placed it out of action for repairs, after which it was relegated to second line use in OTUs until 1944. Also housed at Cosford is Hawker Hurricane LF738, a cannon armed IIc, serving in the Bomber Defence Training Flight and OTUs in the last two years of the war.

RAF Museum Cosford, Shifnal, Shropshire, TF11 8UP

<http://www.rafmuseum.org.uk/cosford/>

Handed over to the RAF in 1918 and one of Fighter Command's busiest aerodromes during the war, Duxford is now part of the Imperial War Museum, and is one of Europe's premier bases for historic warbird displays. Duxford's huge collection of aircraft includes a De Havilland Tiger Moth, Gloster Gladiator L8032 (possibly the only airworthy Gladiator in the world) a Hawker Hurricane IIb and several Supermarine Spitfires, including two Mark Vs of interest to the period of this study. A further Spitfire Ia is also on display at the Imperial War Museum's site in London, a veteran of No. 609 Squadron during the Battle of Britain.

IWM Duxford, Cambridgeshire CB22 4QR
<http://www.iwm.org.uk/visits/iwm-duxford>

For enthusiasts interested in seeing these aircraft in action, the Shuttleworth Collection in Bedfordshire stands alongside Duxford as one of the UK's best historic aircraft venues. In addition to many other aircraft, the Shuttleworth Collection has flying examples of the De Havilland Tiger Moth and Miles Magister. The Tiger Moth is a composite aircraft made up mainly of a trainer which entered service with the RAF in 1940. Shuttleworth also flies AR501, a Supermarine Spitfire Vb which entered service in 1942 with No. 310 (Czech) Squadron at Duxford.

**The Shuttleworth Collection, Shuttleworth (Old Warden) Aerodrome,
Nr. Biggleswade, Bedfordshire, SG18 9EP**
<http://www.shuttleworth.org/>

Outside Britain, several aircraft of the period also exist in museums, warbird collections and in the hands of private collectors. The Smithsonian National Air and Space Museum in Washington, DC, USA, houses a rarer Mk VII Spitfire, an aircraft designed as a high-altitude variant. Perhaps the most prolific survivor of this golden era of Fighter Command, nearly 300 Spitfires remain in displays around the world, with approximately 50 in airworthy condition.

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PUBLISHING

First published in Great Britain in 2012 by Osprey Publishing,
Midland House, West Way, Botley, Oxford OX2 0PH, UK
44-02 23rd St, Suite 219, Long Island City, NY 11101, USA
E-mail: info@ospreypublishing.com

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A CIP catalogue record for this book is available from the British Library

Print ISBN: 978 1 84908 779 7

PDF e-book ISBN: 978 1 84908 780 3

EPUB e-book ISBN: 978 1 78096 898 8

Editorial by Ilios Publishing Ltd, Oxford, UK (www.iliospublishing.com)

Page layout by Mark Holt

Index by Sharon Redmayne

Typeset in Sabon and Myriad Pro

Originated by PDQ Media, UK

Printed in China through Worldprint Ltd

12 13 14 15 16 10 9 8 7 6 5 4 3 2 1

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DEDICATION

To the memory of Flight Lieutenant Andrew Smith, No.47 Squadron.

ACKNOWLEDGEMENTS

The author is indebted to John Hooper and Tim Storrar.

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